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Base Building Capital Expenditures in the Office Sector: Historical Incidence and Implications for Forecasting

by

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ABSTRACT

The following research will indicate that industry standard replacement reserves for base building capital expenditures for commercial office buildings are generally reasonable for more recently constructed buildings but understate actual base building capital expenditures for older buildings. These conclusions are supported by a review of historical base building capital expenditures for a sample of over 150 office buildings of various age and class located throughout the United States.

Reasoning for the conclusion is provided via a discussion of what is known about replacement reserves for base building capital expenditures at commercial office buildings. Encompassing Chapters 1, 2, and 3, this discussion starts with an introduction to capital expenditures in commercial real estate, their magnitude and their impact on real estate investment returns. This is followed by a discussion of disclosure requirements and industry standard practices as they relate to disclosing information on capital expenditures. The discussion then focuses on the magnitude of industry "standard" replacement reserve estimates and their application in practice.

In Chapter 4, the research methodology and characteristics of the data sample are presented. The data analysis methodology is presented in Chapter 5. In Chapter 6, the data results are organized by various building characteristics and conclusions are drawn regarding which building characteristics impact capital expenditures. In Chapter 7, the magnitude of the results of the sample are compared and contrasted against the industry standard estimates presented in Chapter 3.

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Table of Contents

Preface

The following research will indicate that industry standard replacement reserves for base building capital expenditures for commercial office buildings are generally reasonable for more recently constructed buildings but understate actual base building capital expenditures for older buildings. This conclusion is supported by a review of historical base building capital expenditures for a sample of over 150 office buildings of various age and class located throughout the United States.

Chapter 1 presents background on capital expenditures as they relate to commercial office properties. Starting with the two primary categories of capital expenditures, lease-related costs (LRC) and base building costs (BBC), the discussion flows from specific definitions of the different types of capital expenditures to a comparison of the magnitude of BBCs and LRCs. The chapter concludes with a discussion of the impact of base building capital expenditures on the internal rate of return (IRR) from real estate investment.

In Chapter 2, disclosure requirements and standards of practice within the real estate industry are discussed illustrating the lack of disclosure of capital expenditures. In particular, the differences between disclosure of capital expenditures in the public and private markets are explored.

The practical application of replacement reserves and "standard" reserve estimates used in the real estate industry are presented in Chapter 3. The chapter provides examples of how replacement reserves relating to capital expenditures are applied in four primary real estate disciplines; asset management and acquisitions, appraisal, REIT income analysis and lending. The chapter closes with a presentation of standard office building replacement reserves currently applied by participants in the real estate industry.

Chapter 4 presents a description of the research format, including a description of the characteristics of the data sample. The purpose of Chapter 5 is to present the research methodology which is applied in addressing the primary objective of this thesis: estimating a replacement reserve for base building costs in the office sector based on historical capital expenditures.

The results of the various analyses are presented in Chapter 6 and 7. The analysis in Chapter 6 focuses on the results of the data samples when building characteristics are varied, providing indications of which building characteristics may influence capital expenditures. In Chapter 7, the magnitude of the overall data sample results is compared with the industry "standard" replacement reserve estimates presented in Chapter 3. The chapter concludes with a discussion of the implications of the data results for the real estate industry.

A description of reporting requirements for REITs is presented in Appendix A

Detailed tables summarizing the results of the Five and Ten Year Holding Period Data Samples are presented in Appendices B and C.

Acknowledgments

The author would like to thank all the participants who took the time and made the effort to provide the data supporting this thesis. I am also indebted to various other real estate industry professionals for answering questions and providing information utilized in this study. Special thanks goes to Tod McGrath for providing the direction required to complete this effort. I would also like to thank my friends and family for their constant support throughout the process. Last, but not least, I would like to thank my wife, Julie, for her patience, tireless editing assistance and constant support.

Chapter 1: An Introduction to Capital Expenditures in Commercial Real Estate

Introduction

Of the multiple components which influence returns from investment in commercial office buildings, capital expenditures represent one of the least understood and most overlooked. Capital expenditures are so often ignored, that Green Street Advisors, Inc., in reference to Ross Perot's description of how politicians ignore the federal deficit, titled a research piece on capital expenditures, "The REIT Sector's 'Crazy Aunt in the Basement'." Nevertheless, as a result of the number of real estate companies which have gone public during recent years, the subject has attracted the attention of stock analysts, investment bank research departments and real estate researchers. Although many of these sources have performed internal research, the available results suggest that consensus on this issue has not been reached and there remains a great deal of uncertainty when it comes to projecting capital expenditures at commercial office buildings.

For many years, participants in the real estate industry have relied upon "rules of thumb" for projecting capital expenditures. "Standard" replacement reserve estimates were universally applied by investors, asset managers, appraisers and lenders with the belief that the reserve amount accurately reflected capital expenditure requirements for the asset over a standard ten year holding period. Today, although there are no new "rules", many

participants believe that the old "rules of thumb" are, in fact, inadequate and understate actual capital expenditures.

The purpose of this thesis is to address this issue by analyzing historical base building capital expenditures made at over 150 office buildings of various classes located throughout the United States and draw conclusions which can benefit participants active in the real estate market. To the author's knowledge, this reflects the first attempt to support replacement reserve estimates with a large sample of actual historical data.

In order to understand base building capital expenditures and their relevance in real estate investment, it is instructive to examine their magnitude in contrast with other components which influence return on a real estate investment.

Defining Capital Expenditures

Capital expenditures are defined by Barron's Dictionary of Real Estate Terms, Third Edition, as, "An improvement (as distinguished from a repair) that will have a useful life of more than one year. Capital expenditures are generally depreciated over their useful life, as opposed to repairs, which are subtracted from income of the current year."

Capital expenditures at commercial office buildings generally fall into two categories; (1) Lease-related costs and (2) Base building costs.

Lease-Related Costs (LRC)

Lease-related costs are incurred to keep buildings leased and include tenant improvement costs and leasing commissions. These items are defined below.

Tenant Improvement Costs (TIs):	*Items paid for by the landlord when building out a tenant's office space. These items include partitions, ceiling tiles, wallpaper or paint, carpeting, doors, lighting, etc.*
Leasing Commissions (LCs):	*Brokerage fees paid by the landlord to the agents of the tenant and landlord in a lease transaction.*

Base Building Costs (BBC)

Base building costs are incurred by a building owner when maintaining the building in good working condition. Capital expenditures considered BBCs generally fund the replacement of or addition to:

- the physical building substructure (foundation and basement), shell (roof, facade and windows) and common areas (lobby, atrium) except for improvements to tenant spaces (tenant improvements);
- building services and equipment such as conveying systems (elevators, escalators and material handling systems), plumbing, HVAC, fire protection (sprinklers), electrical, communications and security; and
- site improvements such as driveways, parking lots, walks, paving and landscaping.

Typically, BBCs are required to maintain the economic life of a building as well as maintain or improve the marketability of a building. Short-lived items which deteriorate more quickly than the superstructure of the building, such as the roof, windows and parking lot, may need repair or replacement every five to 20 years. Other aspects of a building, such as the lobby, common areas, facade, elevators and HVAC system, may require renovation or replacement to maintain or improve the building's competitive position in the market.

An important issue for consideration when analyzing capital expenditures is introduced in the second sentence of Barron's definition, where it states, "Capital expenditures are generally depreciated over their useful life, as opposed to repairs, which are subtracted from income of the current year." An accounting question which continuously faces the owners of commercial properties is what constitutes a repair versus a capital

improvement. In practice, how these costs are classified depends on the facts and circumstances involved. The underlying factor involved is the manner in which real estate expenses are treated under the tax code.

Generally, an expenditure made by an investor that simply maintains the operating efficiency of the property over its useful life, or the cost of incidental repairs that do not substantially prolong the useful life of the building nor materially increase its value, will be deductible in the current year (classified as repair and maintenance).

Donald Valachi, in his article *Repairs Versus Capital Improvements*, provides an excellent summary of how court cases have determined what should be classified as a capital improvement versus a repair. He states that, "in contrast to repairs, if an expenditure produces any of the following results, it will be classified as a capital improvement.

- *Substantially prolongs the useful life of the property beyond original expectations. (For example: extensively renovating a property; updating the wiring and plumbing; replacing the roof.).*

- *Materially increases the value of the property. (Examples include building a new structure adjacent to an existing structure and completely remodeling or reconstructing an existing building).*

- *Adapts a property to a new use."*

The matter is confused, however, by the fact that an expenditure that does not produce any of the above results is not automatically classified as repairs. Expenditures for substantial alterations made to maintain the value and life of a property will likely be classified as capital improvements by the IRS.

The following table[1] provides an example of circumstances under which certain expenditures made by owners of buildings held for investment would be treated as a repair or capital expense for tax purposes.

[1] Valachi, Donald J., "Repairs Versus Capital Improvements." *Journal of Property Management*, September/October 1995, pp. 76-78.

Table 1-1

TAX TREATMENT OF CERTAIN EXPENDITURES

Type of Expenditure	Deductible Repair	Capital Improvement
Roofing	Patching leaks	Adding a new roof or making a major replacement
Wiring	Minor repairs or temporary replacements	New wiring installation or general replacements
Plumbing	Minor repairs and minor part replacements	Major replacements

The issue of classification of these expenditures is made more difficult when considering income producing properties such as office buildings, shopping centers and industrial facilities. The gray area surrounding the categorization of repairs versus capital expenses is exaggerated by the lease term structures common to these properties, which allow for the building owner to pass-through to tenants certain expenses associated with operating and maintaining the property.

Leases at commercial office buildings typically define those expenses that can be charged back to tenants. Repairs and maintenance items are typically reimbursable. In some instances, the cost of capital improvements which provide for a reduction in operating expenses can be charged back to tenants by the landlord. In any case, when the building owner has the ability to charge the tenants for repairs, they are more apt to categorize items which fall into the gray area as repairs versus capital expenditures. As such, there

is a lack of consistency in the classification of repairs versus capital expenditures when comparing buildings and real estate markets.

Focus on BBCs

The definition of capital expenditures presented on the preceding pages introduces two categories of capital expenditures which are typical to commercial office properties. Although it is important for investors to consider both types of capital expenditures when evaluating investment opportunities, the focus of this thesis is limited to a discussion of base building costs. Discussions with industry participants and a review of existing research and literature on the topic of capital expenditures indicated that there is a comfort level in the industry with the amount of disclosure of, and the ability of industry participants to estimate, lease-related capital expenditures.

In regard to base building costs, recent research has focused on retail properties (Harper and Fiacchi) but not office and industrial. This thesis is focused on BBCs at office buildings because of the lack of existing research and the reemergence of the investment attractiveness of the office sector from the down years of the early 1990s.

Magnitude of Capital Expenditures

In the preceding discussion, capital expenditures were defined and the issues surrounding their accounting considered. In the following section, the magnitude of capital

expenditures in relation to other cost components of income-producing real estate performance is explored.

The following hypothetical building pro forma provides an example of the magnitude of capital expenditures at commercial office buildings.

Table 1-2

OFFICE BUILDING PROFORMA
DOWNTOWN, BOSTON, MA MSA

Gross Income [1/]	$25.74
Operating Expenses [1/]	11.75
Net Operating Income [1/]	13.99
TIs and Leasing Commissions [2/]	2.57
Base Buildings Costs [3/]	0.40

1/ IREM 1996 Income/Expense Analysis: Office Buildings, Metropolitan Boston Downtown Office Buildings.
2/ Weighted average annual releasing costs based on renewal probability of 70 percent, releasing cost of $27/square foot for new tenants and $11/square foot for renewals and average lease term of 10 years. Cost is amortized over ten year lease term at an interest rate of 10 percent.
3/ Base building reserve amount for Beacon Properties as estimated by Green Street Advisors.

As indicated in the preceding table, operating expenses account for 46 percent of median office building income for downtown office buildings in metropolitan Boston, Massachusetts. Lease related capital expenditures equate to approximately 10 percent of gross income and 18 percent of net operating income and annual average base building costs equate to approximately 1.6 percent of gross income and 3 percent of net operating

income. Based on the preceding proforma statement, LRCs are approximately 6.5 times greater than BBCs.

Normalized estimates of lease related and base building capital expenditures are expressed in the prospectus of Real Estate Investment Trusts (REITs) when they offer securities to the public. Boston Properties, Inc. was the most recent office REIT to go public. Boston Properties', Inc. normalized pro forma projection, which is based on historical averages and projected lease rollovers, is summarized in the table below.

Table 1-3

Pro Forma Cash Flows From Operations
Boston Properties, Inc.

Funds From Operations (FFO)	$96,765,000
LRC	$5,996,000
BBC	$1,642,000
LRC as % of FFO	6.2%
BBC as % of FFO	1.7%
LRC/BBC	3.65

Note: LRC and BBC are estimated annual provisions for lease related and base building capital expenditures for office and industrial properties owned by Boston Properties, Inc.
Source: Boston Properties, Inc., *Prospectus,* June 17, 1997.

A more detailed analysis of historical income and capital expenditures for the predecessor company(ies) of Boston Properties, Inc. is presented in the following table.

Table 1-4

ANALYSIS OF HISTORICAL CAPITAL EXPENDITURES VERUS INCOME
BOSTON PROPERTIES, INC.
(In Thousands)

	1992	1993	1994	1995	1996
Gross Income	$ 177,370	$ 182,776	$ 176,725	$ 179,265	$ 195,006
Operating Expenses	57,086	62,405	61,337	63,719	66,798
NOI (FFO)	120,284	120,371	115,388	115,546	128,208
Capital Expenditures					
LRC	$ 6,084	$ 4,797	$ 7,157	$ 9,743	$ 15,124
as % of GI	3.4%	2.6%	4.0%	5.4%	7.8%
as % of NOI	5.1%	4.0%	6.2%	8.4%	11.8%
BBC	$ 1,425	$ 1,547	$ 1,812	$ 1,618	$ 1,803
as % of GI	0.8%	0.8%	1.0%	0.9%	0.9%
as % of NOI	1.2%	1.3%	1.6%	1.4%	1.4%
Total Cap. Exp.	$ 7,509	$ 6,344	$ 8,969	$ 11,361	$ 16,927
as % of GI	4.2%	3.5%	5.1%	6.3%	8.7%
as % of NOI	6.2%	5.3%	7.8%	9.8%	13.2%
BBC as % of Cap. Exp.	19.0%	24.4%	20.2%	14.2%	10.7%
LRC/BBC	4.27	3.10	3.95	6.02	8.39

Source: Boston Properties, Inc., *Prospectus*, June 17, 1996.

This table illustrates that on average, over the last five years, LRCs in the Boston Properties' portfolio have cost approximately five times more than BBCs. In addition, the table illustrates that capital expenditures, especially base building costs, are generally small in relation to a building's normal operating expenses. During the five year period, LRCs as a percentage of operating expenses, ranged from 8 to 22 percent and BBCs as a percentage of operating expenses ranged from 2 to 3 percent. This example provides a picture of the relative magnitude of capital expenditures to other cost components of a commercial office building. In later chapters, absolute measures of BBCs will be analyzed.

The historical capital expenditure figures for the predecessor companies are almost all higher than the forward looking pro forma figures presented in Boston Properties, Inc.'s prospectus. This is not unusual because LRCs may vary based on the anticipated volume of lease rollovers and conditions in the leasing market. Boston Properties' pro forma is based on a lower volume of anticipated lease rollover (due to lease contracts) in the near term than is reflected in their historical summary.

Generally, lease rollovers are not constant from year to year but vary depending on the expiration dates of existing leases and the length of terms of recently executed leases. In addition, the cost of tenant improvements can vary depending on market conditions and the strength of the leasing market (balance between supply and demand). When leasing market conditions are strong and favor landlords, tenant improvement allowances may decline reducing a landlord's cost of re-leasing.

The Boston Properties, Inc. example reflects a portfolio of buildings as opposed to a single asset. As such, the volatility in lease rollovers from year to year is minimized. For an individual asset, lease rollover in any given year can be as low as zero and as high as 100 percent. In addition, when considering LRCs, there can be significant differences in costs from one building to the next depending on where the buildings are located and leasing market conditions in their respective markets.

The previous discussion demonstrated that capital expenditures are generally small in relation to other cost components of operating an office building. Nevertheless, capital

expenditures in excess of expectations can influence investment returns. The cash flows on the following page demonstrate the impact of varied base building capital expenditures on investment returns.

To facilitate this analysis, the downtown Boston MSA office building pro forma presented earlier has been converted into a ten year cash flow. Utilizing the projected Year 11 cash flow for a reversion value, a hypothetical ten year holding period for an office building is projected. The impact of base building costs on investment return are projected by varying BBCs in three scenarios and holding all other inputs, including purchase price, constant. For the purpose of this analysis, all figures are kept in constant dollars.

The following assumptions have been made for this analysis.

- *Purchase price of $139.90 per square foot (sf)*
- *Reversion sales price at the end of 10 years of $139.90 per square foot*

The BBCs have been varied in the three scenarios as indicated in Table 1-5.

Table 1-5

THE IMPACT OF CAPITAL EXPENDITURES ON INTERNAL RATE OF RETURN (IRR)
A SAMPLE CASE STUDY

Scenario	Base Building Costs (BBC)	IRR
Case 1 - Base Case	$0.40 per sf	9.71%
Case 2 - 75% increase	$0.70 per sf	9.50%
Case 3 - 125% increase	$1.00 per sf	9.29%

The base case (Case 1) provides an internal rate of return (IRR) of 9.71 percent. In comparison, the IRR falls 21 basis points in Case 2 to 9.50 percent and 42 basis points in Case 3 to 9.29 percent. Although these declines are not extraordinary, they highlight the importance of accurately projecting base building capital expenditures when evaluating an investment.

PROPERTY CASH FLOW PROJECTIONS
ILLUSTRATING IMPACT OF BASE BUILDING COSTS ON IRR

Case 1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Reversion
Gross Income	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74
Operating Expenses	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75
NOI	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99
BBC	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
CAD	13.59	13.59	13.59	13.59	13.59	13.59	13.59	13.59	13.59	13.59	
Reversion Sales Price										139.90	
Cash Flows	$ 13.59	$ 13.59	$ 13.59	$ 13.59	$ 13.59	$ 13.59	$ 13.59	$ 13.59	$ 13.59	$ 153.49	
Purchase	$ 139.90										
IRR	9.71%										

Case 2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Reversion
Gross Income	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74
Operating Expenses	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75
NOI	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99
BBC	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	
CAD	13.29	13.29	13.29	13.29	13.29	13.29	13.29	13.29	13.29	13.29	
Reversion Sales Price										139.90	
Cash Flows	$ 13.29	$ 13.29	$ 13.29	$ 13.29	$ 13.29	$ 13.29	$ 13.29	$ 13.29	$ 13.29	$ 153.19	
Purchase	$ 139.90										
IRR	9.50%										

Case 3	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Reversion
Gross Income	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74	$ 25.74
Operating Expenses	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75
NOI	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99
BBC	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
CAD	12.99	12.99	12.99	12.99	12.99	12.99	12.99	12.99	12.99	12.99	
Reversion Sales Price										139.90	
Cash Flows	$ 12.99	$ 12.99	$ 12.99	$ 12.99	$ 12.99	$ 12.99	$ 12.99	$ 12.99	$ 12.99	$ 152.89	
Purchase	$ 139.90										
IRR	9.29%										

Chapter 2: Disclosure Standards and Practices

Disclosure Standards and Practices

In the preceding chapter, the relative significance of capital expenditures in office building investment was explored. The next logical step in this analysis is to look at actual base building capital expenditures for office buildings. However, information on base building capital expenditures has been kept proprietary throughout the history of the real estate industry. It was not until the recent REIT IPO boom of the early-1990s that any information on these costs was made available to the public.

The level of disclosure which exists in a market is influenced by legal requirements, investor demands and industry standard practices. The real estate industry in the United States has existed as an almost exclusively private market until very recently. Historically, the primary ownership structure for real estate investment has been the partnership or joint venture. Typically, this structure consisted of a general partner whose primary business was developing or operating real estate and limited partners whose business was not related to real estate. Whether investing for tax purposes or portfolio diversification, the limited partners typically required only general information regarding the performance of the real estate in which the partnership had an interest. As such, this ownership structure facilitated little to no disclosure and maintained the industry's proprietary nature towards information disclosure. Over time, only the general partners had detailed information on capital expenditures at commercial properties.

As a result of capital constraints in the early 1990s, many of the real estate operating companies which served as the general partners in private partnerships went public as Real Estate Investment Trusts (REITs). Governed by the reporting rules of the Securities and Exchange Commission (SEC), and influenced by industry analysts, these formerly proprietary entities have had to provide more disclosure than they were previously accustomed to.

REITs are required to file the following reports on an ongoing basis and prior to issuing securities. Specific provisions of these requirements are provided in Appendix A and are summarized here.

Table 2-1

FINANCIAL REPORTING REQUIREMENTS FOR PUBLIC REAL ESTATE ENTITIES
SUMMARY OF MAJOR FORMS

Form	Description
S-11	*Primary document required for the registration of public real estate securities. Has the greatest level of disclosure. Minimum of three years financial history.*
8-K	*Filed when significant events occur. Can have no financial disclosure.*
10-Q	*Filed quarterly, contains condensed financial statements (unaudited). The level of detail in this filing is limited.*
10-K	*Annual report. Contains detailed reporting but not usually as detailed as S-11.*

All financial statements required in these SEC forms are governed by Generally Accepted Accounting Principles (GAAP) accounting standards. Under GAAP, capital expenditures are capitalized as opposed to expensed. As such, they are not required to be disclosed in any of the financial statements provided in the forms described in Table 2-1. Capital expenditures may be indirectly disclosed in a depreciation schedule. Nevetheless, when compared against the minimum requirements for reporting in the private real estate market, the disclosure requirements for public entities are significant (see table below).

Table 2-2

REQUIRED INFORMATION DISCLOSURE
REAL ESTATE ENTITIES

	Public		Private	
Report	**REITs**	**CMBS**	**Pension Funds**	**Joint Ventures**
Income Statement	X			
Balance Sheet	X			
Cash Flows	X			
Debt	X	X		
Property Descriptions	X	X		
Lease Rollovers				
LRCs				
BBCs				

Table 2-3

DISCLOSURE IN PRACTICE
REAL ESTATE ENTITIES

	Public		Private	
Report	**REITs**	**CMBS**	**Pension Funds**	**Joint Ventures**
Income Statement	X		X	X
Balance Sheet	X		X	X
Cash Flows	X	X	X	X
Debt	X	X	X	X
Property Descriptions	X	X	X	X
Lease Rollovers	X			
LRCs	X			
BBCs	X			

Notes: For CMBS, cash flows refers to statement of NOI for individual properties which are securing loans. Disclosure by private entities varies significantly from deal to deal; table represents common practice.

These tables illustrate the differences in required disclosure for public and private real estate ownership as well as the differences in the level of disclosure provided in practice by public and private ownership. A striking feature of this comparison is that despite a higher level of required disclosure than private entities, REITs in practice provide disclosure exceeding their legal requirements and the levels practiced by their private counterparts. The most commonly accepted reason for REITs practicing this greater level of disclosure is investor demand, or more appropriately stated, analyst demand for information.

In order to raise capital, REITs need to sell shares in the public equity markets. Therefore, they need to provide enough information to satisfy prospective equity investors. During the early-1990s, a number of real estate companies focused in the

office sector decided to go public as a means of accessing capital. Due to soft market conditions for office buildings throughout the country, investors were dubious of companies focused in a depressed property sector. In order to attract investors, management of office sector REITs needed to provide more information than had historically been required of REIT IPOs. As more office sector real estate operating companies have come public in recent years, the trend for providing greater levels of disclosure has continued. It is now common for S-11 documents to provide at least three years history of capital expenditures, broken down by LRCs and BBCs, for the portfolio of properties in the REIT.

With regard to REITs and disclosure, S-11 documents provide the greatest level of disclosure for items such as capital expenditures. Many REITs do not provide ongoing detail on these costs in formal reporting. Some REITs do provide additional detailed disclosures, including capital expenditures, as exhibits at their web site on the internet. Other efforts are being made to make more property operating information available through the internet.

Similar to REIT disclosure, reporting in the private sector is investor driven. However, the demands of these investors are more varied and sometimes less information is preferable. Pension fund advisors, whether they are general partners in a joint venture, or directly investing on behalf of a commingled fund, determine reporting based on the needs of their clients or partners. As such, the level of disclosure can be significant or

minimal. It is unusual for advisors to report on capital expenditures unless a property is undergoing a major renovation which was anticipated prior to investment.

With regard to disclosure of capital expenditure information, industry participants draw separate conclusions for LRCs and BBCs. Generally, industry participants are satisfied with the level of disclosure of lease related capital expenditures. This is not surprising because lease related costs effectively function in a spot market, where there is substantial information present. The leasing market is dynamic; the flow of information between brokers is constant and it is important to know what deals are being done at all properties in the market. Despite building owners desire for confidentiality, lease information flows rather freely throughout individual markets. As such, at any point in time, in any market, it is fairly easy to produce a comfortable estimate of lease related costs for individual assets. Given that many such estimates are made on a portfolio basis, an even greater comfort level is attainable because LRCs can be estimated on a regional basis, which requires less detailed market knowledge.

With regard to base building costs, most industry participants expressed a desire for greater disclosure on an industry wide basis. Recent research pieces by REIT analysts have focused on making adjustments to REIT FFO for recurring base building capital expenditures. The methodologies described in this research focus on analysts' interacting with REIT management to determine appropriate reserve estimates for individual companies while also applying a cost based useful life approach as a test of reasonableness. The REIT analysts are generally discarding the historic base building

expense figures provided by REIT management because they believe the historical figures understate what actual expense requirements will be over the long term. In this case, the analysts believe the disclosure is skewed by the general characteristics of the properties owned by most office REITs, which are of more recent construction, requiring less extensive capital expenditures.

Holding with the real estate industry's proprietary nature, the disclosure of detailed information such as capital expenditures remains limited. Although the level of disclosure has increased with growth in the REIT sector, GAAP accounting standards do not require disclosure of base building capital expenditures. As such, those industry participants not in a proprietary position may lack the necessary information to make useful estimates of base building capital expenditures.

Chapter 3: Industry Applications of Replacement Reserves and Industry Standard Reserve Amounts

As mentioned in the introduction in Chapter 2, a replacement reserve is used as a proxy for base building capital expenditures in projections of property cash flows made by investors, asset managers, appraisers and lenders. Prior to reviewing the results of the data sample, it is relevant to define replacement reserves and review how they are estimated. In addition, to analyze the results of the data sample in their proper context, it is relevant to review the heuristic market estimates which are currently being applied by industry participants.

Replacement Reserves

Replacement reserves represent an amount set aside each year to pay for the eventual wearing out of short-lived assets. In the case of commercial office buildings, the items for which a replacement reserve is set aside are those items included in the previous definition of capital expenditures. Replacement reserves are funded from the cash flows of a building after paying for all operating expenses and mortgage payments.

An example calculation of a replacement reserve for a single item is as follows:

The owner of an office building determines that the roof of the building has a remaining useful life of fifteen years. The owner estimates that replacing the roof fifteen years from

now will cost $1 million. The calculation required to determine the amount that must be set aside each year to generate $1 million fifteen years from now is an annuity calculation. To calculate the annuity payment, the future value of the annuity is multiplied by the sinking fund factor. The formula for calculating the sinking fund factor is presented in Figure 3-1.

Figure 3-1

SINKING FUND FACTOR FORMULA

$$\text{Sinking Fund Factor} = \frac{1}{(1+i)^n - 1}$$

where, i = the savings rate and n = the number of years.

The building owner solves the question, What annual payment earning the current savings rate will produce a future value (FV) of $1 million in fifteen years?

Figure 3-2

EXAMPLE CALCULATION OF REPLACEMENT RESERVE
CALCULATION OF SINKING FUND FACTOR

$$\text{Sinking Fund Factor} = \frac{1}{(1+.06)^{15} - 1} = 0.042963$$

Plugging in the savings rate of 6 percent (i) for fifteen years (n), results in a sinking fund factor of 0.042963. Multiplying the sinking fund factor by the future value of $1 million results in a required annual payment of $42,963. Therefore, if the building owner sets

aside $42,963 per year in each of the next fifteen years, a total of $1 million will have accumulated by the end if the fifteenth year.

For the purposes of this discussion, the term replacement reserve refers to an amount set aside each year to pay for the eventual wearing out and replacement of those items specified in the definition of base building costs provided in Chapter 2.

Replacement Reserves in Practice

Replacement reserves are applied by various participants in the real estate industry. Asset managers utilize replacement reserves as a tool in capital budgeting and in measuring investment returns. Acquisitions officers use a replacement reserve as a proxy for future capital expenditures when generating projections for pricing properties. Appraisers, when valuing commercial buildings, generally use replacement reserves in the same manner as acquisitions officers. Analysts use replacement reserves to adjust funds from operations (FFO) of real estate investment trusts (REITs). Commercial lenders typically require borrowers to fund replacement reserve accounts for known capital repairs as well as for potential future lease related capital expenditures.

To gain an understanding of replacement reserve estimates currently being applied by participants in the real estate industry, investor surveys, REIT analyst research reports, and REIT registration documents were reviewed by the author. In addition, rating agencies, appraisers and lenders were contacted. The research resulted in various sources

of information on replacement reserves, many of which are utilized by market participants as references in applying reserve estimates in real estate projections.

The following is an excerpt from an investor survey published by Peter F. Korpacz & Associates indicating reserve estimates of major investors active in the national central business district (CBD) and suburban office markets.

Table 3-1
BASE BUILDING CAPITAL EXPENDITURE REPLACEMENT RESERVE ESTIMATES NATIONAL INVESTOR SURVEY

National CBD Office Market		National Suburban Office Market	
Investor Description	**Reserve (Per SF)**	**Investor Description**	**Reserve (Per SF)**
Investment Advisor	$0.10 to $0.15	Investment Advisor	$0.10 to $0.15
Investment Banker	Varies	Investment Banker	Varies
Pension Fund Advisor	$0.10 to $0.15	Pension Fund Advisor	$0.10 to $0.20
Investment Advisor	$0.20 to $0.40	Investment Advisor	$0.20 to $0.40
Domestic Pension Fund	$0.20 to $0.50	Domestic Pension Fund	$0.20 to $0.50
Investment Advisor	$0.20	Investment Advisor	$0.10 to $0.20
Real Estate Consultant	$0.05 to $0.20	Investor	$0.50
Institutional Investor	$0.15 to $0.25	Real Estate Consultant	$0.05 to $0.20
Investment Advisor	$0.05 to $0.15	Institutional Investor	$0.15 to $0.20

Source: Peter F. Korpacz & Associates, Inc., First Quarter 1997

The survey results illustrate the variety of reserve estimates which are being applied in practice in the industry. Generally, the estimated reserves are slightly higher in the CBD markets as compared to the suburban markets.

The replacement reserve ranges for office buildings provided in the underwriting guidelines for mortgage conduit programs followed by the primary rating agencies appear to mirror the range indicated by the Korpacz investor survey (see table which follows).

Table 3-2

RATING AGENCY CONDUIT UNDERWRITING GUIDELINES
REPLACEMENT RESERVES FOR OFFICE BUILDINGS

Rating Agency	Reserve (Per SF)
Standard & Poor's	$0.15 to $0.25
Moody's	$0.20 to $0.40
Duff & Phelps	$0.15 to $0.25

Another source of information on replacement reserve estimates for office buildings are REIT analysts. Because FFO, the most common income measurement for REITs, does not include deductions for normalized capital expenditures, analysts adjust FFO for these items by applying a reserve. The following table presents the replacement reserve estimates applied by Green Street Advisors, Inc. and PaineWebber for certain office sector REITs which they follow.

Table 3-3

BASE BUILDING CAPITAL EXPENDITURE RESERVE ESTIMATES
OFFICE REIT SECTOR
(Per Square Foot)

REIT	Market Orientation	Green Street	PaineWebber
Beacon Properties	Urban	$0.40	$0.23
CarrAmerica	Urban	$0.55	$0.20
Crescent	Suburban	N/A	$0.14
Highwoods	Suburban	$0.30	$0.08
Speiker Properties	Suburban	$0.30	$0.07

Sources: Green Street Advisors, Inc., *Capital Expenditure Requirements The REIT Sector's "Crazy Aunt in the Basement"*, June 17, 1996.
PaineWebber, *REIT CAD Estimates*, First Quarter 1997 Update.

The replacement reserve estimates of the two firms vary significantly; however, both sources apply higher reserves to REITs owning properties with an urban market orientation. The Green Street estimates are at the high end of the range indicated by respondents of the Korpacz survey, while PaineWebber's reserve estimates fall toward the middle- to low-end of the Korpacz range.

Additional indications of replacement reserves come from REIT prospectus. The table which follows indicates the pro forma estimate for recurring base building capital expenditures for three office sector REITs which have gone public within the last year. These figures fall toward the middle of the Korpacz range and closer to PaineWebber's estimates.

Table 3-4

RECENT OFFICE REIT IPOs
PRO FORMA ESTIMATE FOR RECURRING BASE BUILDING CAPITAL EXPENDITURES

REIT	Reserve (Per SF)	Market Orientation
Prentiss Properties Trust	$0.15	Suburban
Boston Properties, Inc.	$0.20	Suburban
Equity Office Properties Trust	$0.19	Mixed

Source: EDGAR, Securities and Exchange Commission

This analysis provides an example of the wide range of replacement reserve estimates which are being expressed by industry participants. While the Korpacz survey does not specify what quality of assets the investors are responding to, the quality of the assets owned by the REITs noted in Tables 3-3 and 3-4 are generally very high, which should suggest replacement reserves at the lower end of the possible spectrum.

A review of replacement reserve estimates currently applied in the real estate industry suggests that there is a need for greater clarity in regard to what estimates are appropriate for office buildings of differing age, size and location. The lack of detail provided in support of these estimates ties back to the lack of disclosure which is pervasive in the real estate industry. These factors lead to questioning of the usefulness of available information on replacement reserves, as it appears that reserve estimates can be as easily misapplied as they can be used correctly. It is also apparent that the generic use of these market "rules of thumb" undoubtedly results in improper investment underwriting in all

four quadrants of real estate investment (whole loans, CMBS, REITs and direct investment).

Chapter 4: Research Methodology and the Data Sample

In Chapter 2, it was demonstrated that publicly available capital expenditure information is limited to data disclosed by REITs. This information pertains only to a portfolio of properties and not individual assets. As such, information on historical capital expenditures for individual assets was sought by the author from private real estate owners and advisors. It is worth noting that several office sector REITs were contacted as potential sources of information; however, these REITs would not disclose asset level detail which exceeded what they would otherwise disclose to investors and analysts.

Over twenty large and small companies were contacted, with a focus on large institutional investors and advisors. The following data was requested on each building.

- building size
- geographic mix (location)
- market orientation (urban versus suburban)
- height (number of floors)
- year built
- historical base building capital expenditures for a minimum of five years

Companies were provided with the specific definition of base building capital expenditures presented in Chapter 2 and were asked to provide data only on those costs which fell within that specific definition.

Many of the companies solicited provided data. The data sources are essentially a mix of advisors and institutional investors. As mentioned, the public companies contacted would not disclose capital expenditures on an individual asset basis.

For the purposes of this analysis, the data sample was organized into two overlapping groupings corresponding to two holding periods: Five Years and Ten Years. The five and ten year holding periods reflect typical time frames investors use when making cash flow projections for investment purposes.

Presented in Addenda B is a detailed listing of the characteristics of each of the holding period samples. Because the minimum number of consecutive years required for inclusion in the sample was five, the five year holding period grouping reflects the entire sample. The following discussion highlights the relevant characteristics of the five and ten year holding period samples.

Sample Size

The number of buildings and total building area constituting the five and ten year holding period samples are presented in the following table. Because the building area measurements reported by the participants include changes in rentable area, the building area figures reflect the weighted average for the sample over the length of the holding period.

Rentable building area may change as a result of re-measurement, reconfiguration, or addition to a building. Buildings are periodically measured and based on the standards of a particular market the measurement of rentable area can change. In addition, the rentable area may change when space is reconfigured. For example, space on the ground level which was not considered leasable can be reconfigured and become rentable. Upon reconfiguration, this space gets added into the rentable building area changing the building's overall net rentable area.

Table 4-1

FIVE AND TEN YEAR HOLDING PERIOD SAMPLES
SAMPLE SIZE

Sample	No. of Buildings	Weighted Avg. Area (SF)
Five Year Holding Period	154	32,062,308
Ten Year Holding Period	48	8,560,291

Building Size

The range in building size in the samples is quite significant, reflecting the variety in sizes of urban and suburban, high, mid and low rise office buildings. The minimum, maximum and average (mean) building size of the five and ten year holding period samples are summarized in the following below.

Table 4-2

FIVE AND TEN YEAR HOLDING PERIOD SAMPLES
MINIMUM, MAXIMUM AND AVERAGE BUILDING SIZE

Sample	# of Buildings	Minimum (SF)	Maximum (SF)	Average (SF)
Five Year	154	25,175	1,053,000	208,197
Ten Year	48	25,175	992,455	178,339

The average building area is approximately 17 percent higher in the five year holding period sample. The minimum building size is the same in each sample. The ten year sample does not contain any buildings with a net rentable area of greater than 1 million square feet.

For analysis purposes, the buildings were categorized into five groupings by building size. These groups are; (1) buildings less than 100,000 square feet, (2) between 100,000 and 249,999 square feet, (3) between 250,000 and 499,999 square feet, (4) between 500,000 and 999,999 square feet, and (5) greater than 1,000,000 square feet. Figures 4-1 and 4-2 present the distribution of buildings within the building size categories for the five and ten year holding period samples. Figures 4-3 and 4-4 present the distribution of building area within the building size categories.

Figure 4-1

FIVE YEAR HOLDING PERIOD SAMPLE

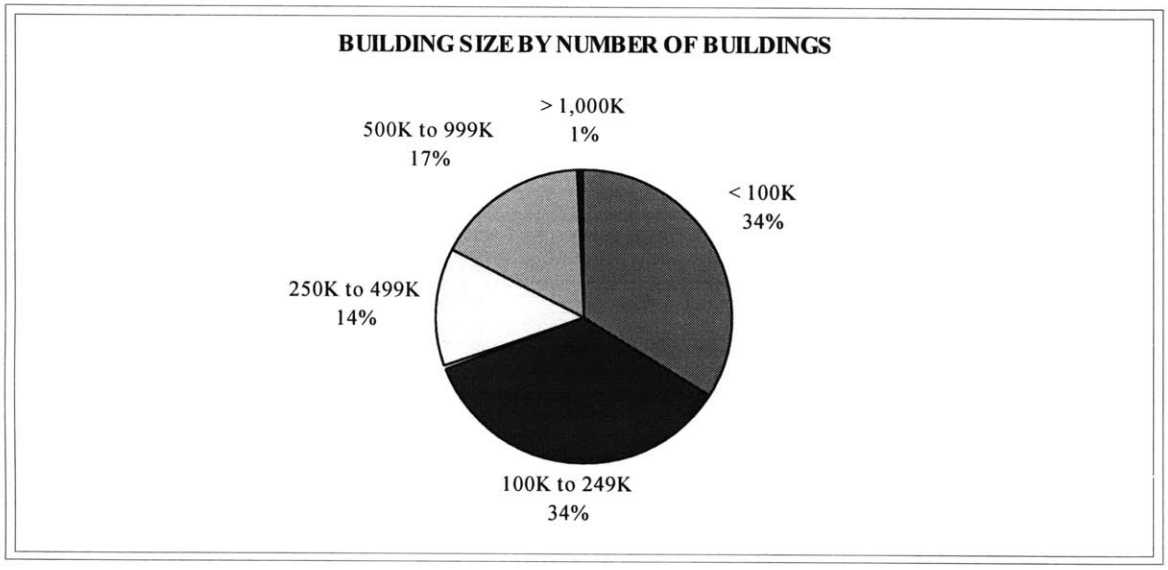
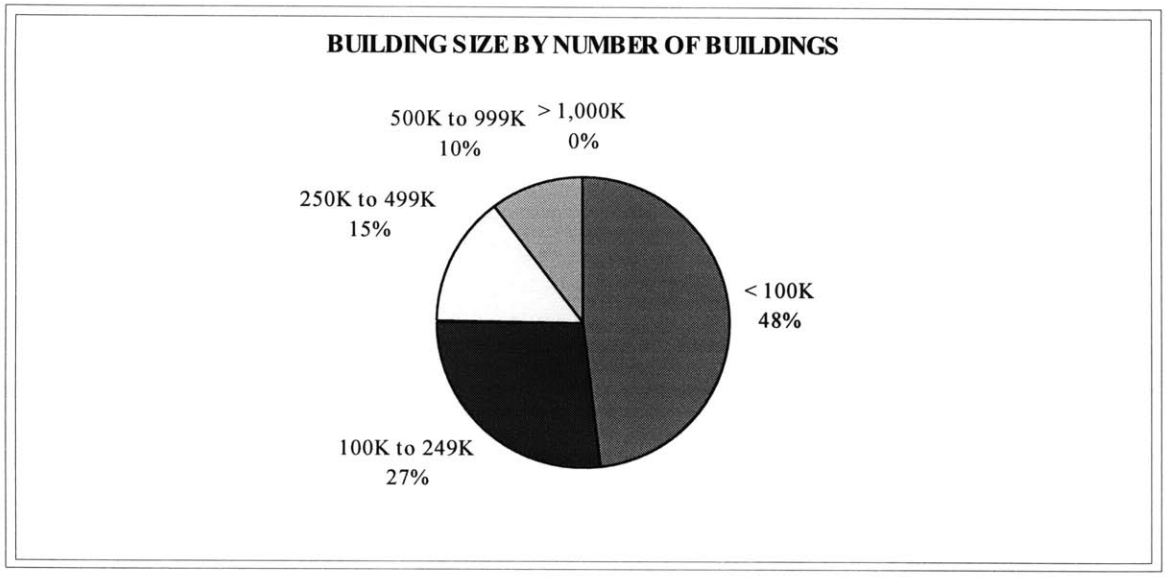


Figure 4-2

TEN YEAR HOLDING PERIOD SAMPLE



In both the five and ten year holding period samples, buildings greater than 1 million square feet account for less than 10 percent of the sample's building area (Figures 4-3 and

4-4). Buildings of less than 100,000 square feet make up a much greater share of the ten year sample's buildings than the five year sample (Figures 4-1 and 4-2). However, their share of sample building area is only slightly higher. In general, the bulk of each sample's building area is comprised of buildings of between 100,000 and 500,000 square feet.

Figure 4-3

FIVE YEAR HOLDING PERIOD SAMPLE

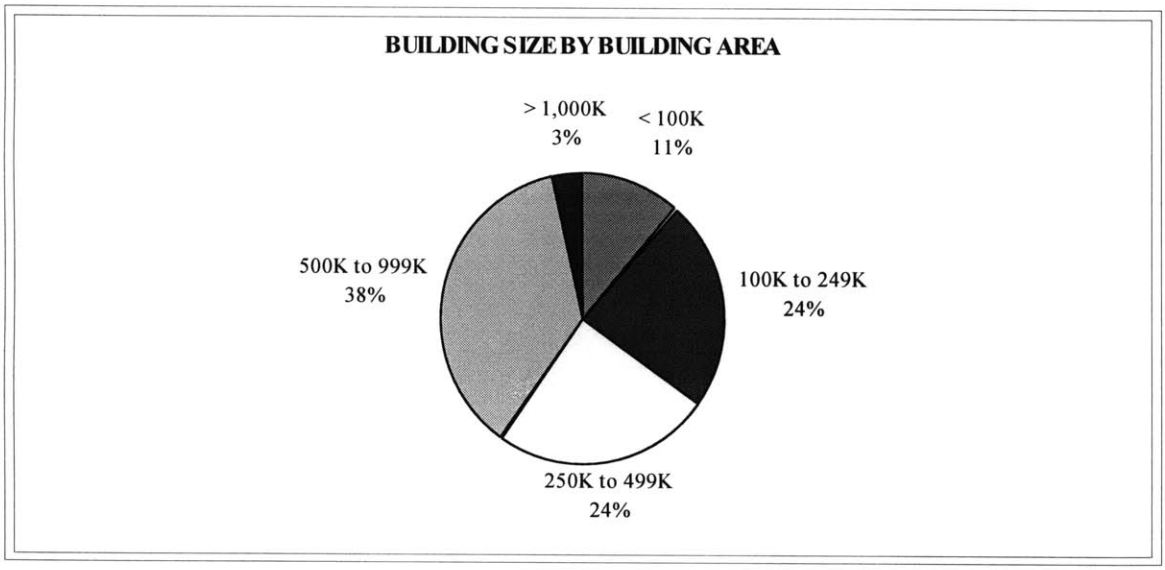
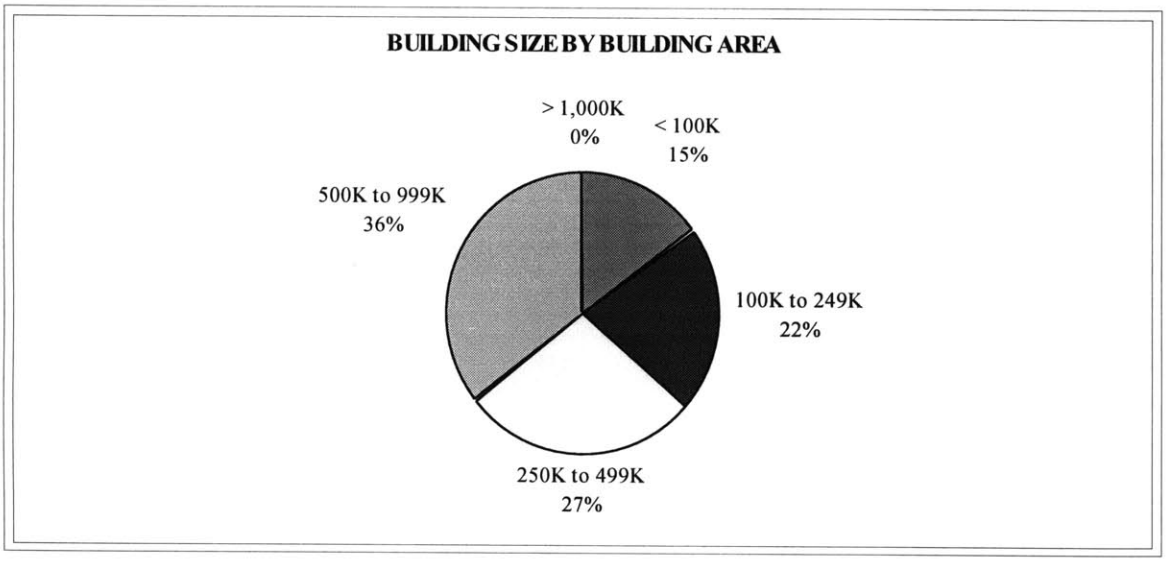


Figure 4-4

TEN YEAR HOLDING PERIOD SAMPLE



Generally, it is the author's opinion that the size of the buildings in the samples are representative of a cross section of building sizes in the national office market.

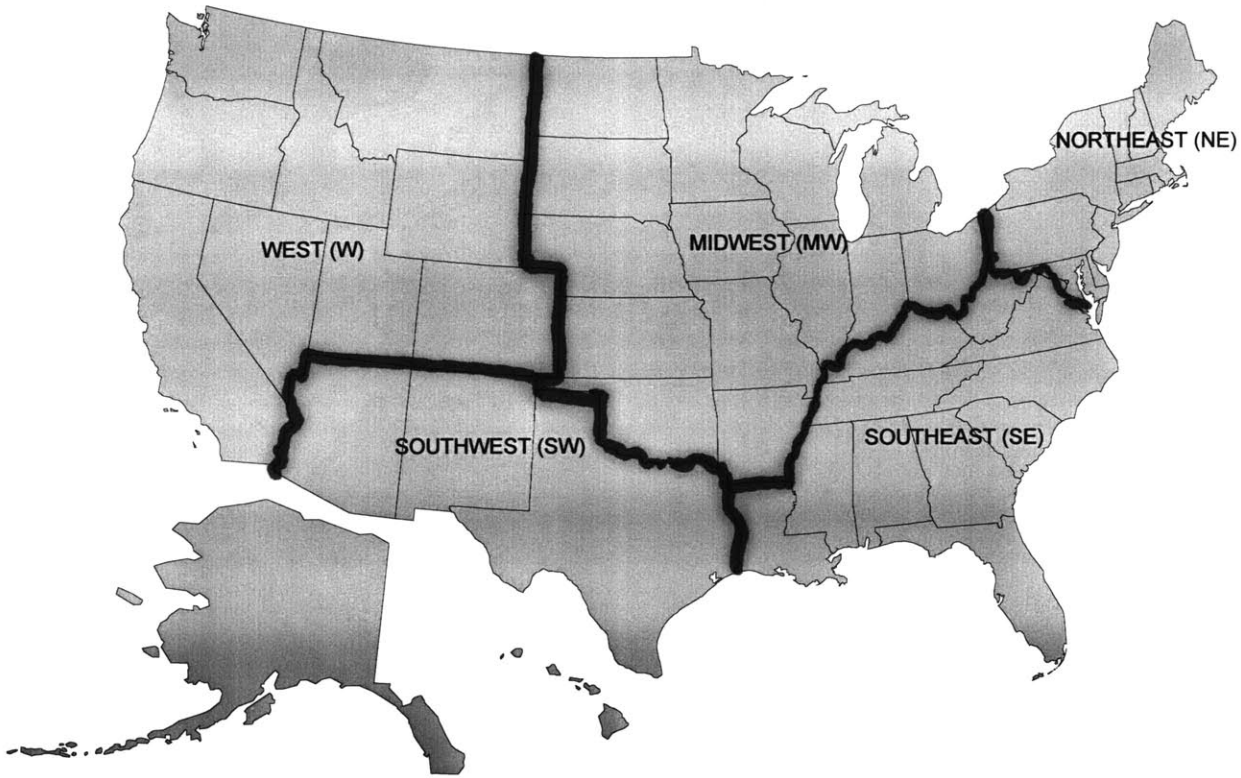
Geographic Mix

The data sample reflects a well diversified mix of properties from throughout the United States. Figures 4-5 and 4-6 illustrate the geographic mix by five regions, Northeast (NE), Southeast (SE), Midwest (MW), Southwest (SW) and West (W) for each of the holding period samples. Presented on the following page is a map depicting the boundaries of the geographic regions as they have been delineated for the purposes of this analysis. Because the data providers classified buildings based on internal geographic determinants, the boundaries suggested here were chosen to best reflect the

characterizations of the data providers and are not based on regional economic or other factors.

The Northeast region includes all of the New England states, New York, New Jersey, Pennsylvania, Maryland and Northern Virginia (the Virginia suburbs of Washington, DC). The Southeast region includes all the Southern coastal states, Virginia, North and South Carolina, Georgia and Florida, and Alabama, Mississippi, Kentucky, Tennessee, W. Virginia and Louisiana. The Midwest region covers all the states north of Texas and east of the boundary line formed by Montana, Wyoming and Colorado. The Southwest region includes Texas, New Mexico and Arizona. The Mountain states and Pacific coast states comprise the West region.

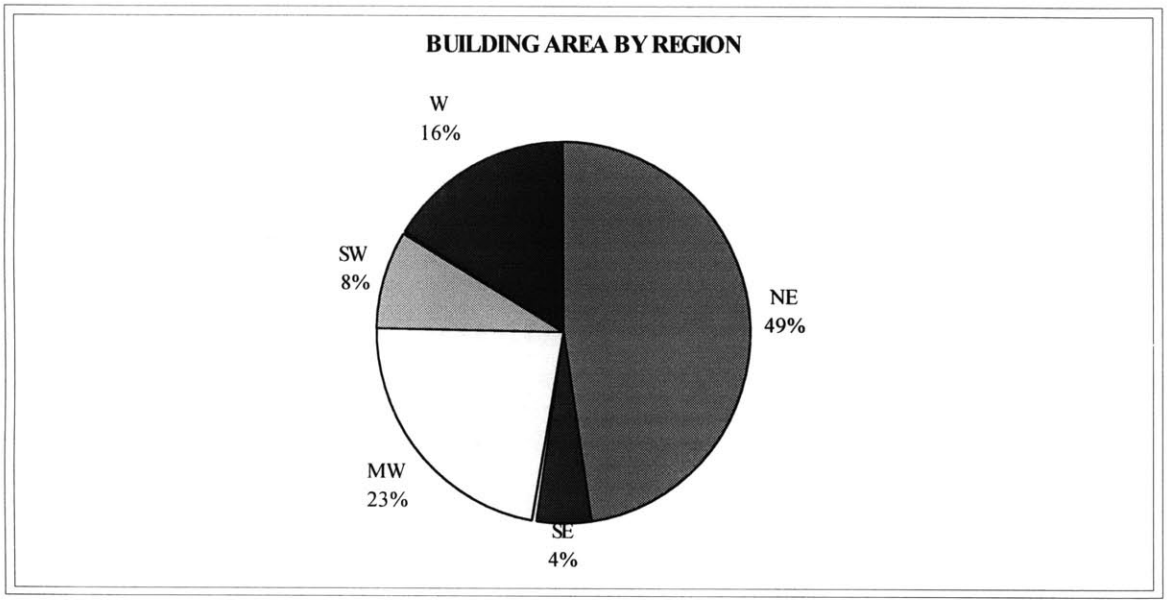
GEOGRAPHIC BOUNDARY MAP



As Figure 4-5 indicates, for the five year holding period, the greatest concentration of data in terms of building area is located in the Northeast region. The Southeast and Southwest regions are generally under-weighted. Combined, these regions account for only twelve percent of the building area in the five year holding period sample.

Figure 4-5

FIVE YEAR HOLDING PERIOD SAMPLE



The Northeast and Midwest regions contain the highest number of buildings in the five year holding period sample (see Table 4-3). The average building size of the Northeast properties is much larger than that of the buildings in the Midwest, accounting for the greater percentage of building area coming from the Northeast region.

Table 4-3

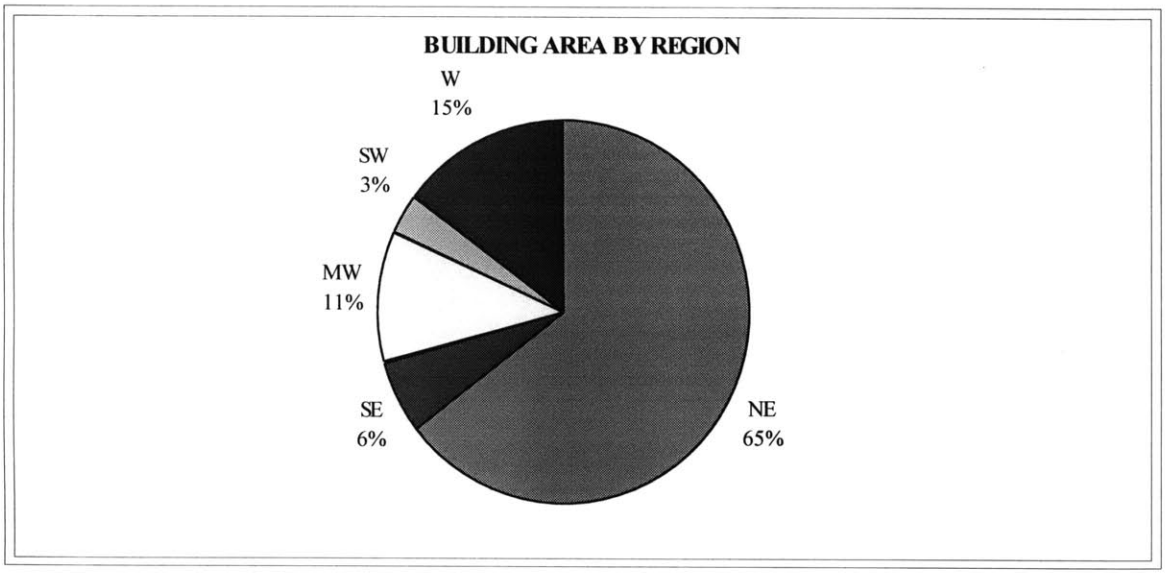
FIVE YEAR HOLDING PERIOD BY REGION
NUMBER OF BUILDINGS AND AVERAGE BUILDING SIZE

Region	No. of Buildings	Avg. Building Area (SF)
NE	55	278,550
SE	8	179,992
MW	41	182,081
SW	19	137,748
W	31	168,374

The ten year holding period sample is dominated by the Northeast region. The Southeast and Southwest regions, combined, account for less than 10 percent of the sample's building area (see Figure 4-6). The West and Midwest regions, combined, contain only 40 percent of the building area contained in the Northeast region in the ten year holding period sample.

Figure 4-6

TEN YEAR HOLDING PERIOD SAMPLE



In terms of number of buildings, the West and Northeast regions contain the same amount in the ten year holding period sample (see Table 4-4). In this sample, however, the difference in the average building size between the Northeast and West regions is extreme, accounting for the Northeast region's large share of building area. The Southeast and Southwest regions contain only three and four buildings, respectively.

Table 4-4

TEN YEAR HOLDING PERIOD BY REGION
NUMBER OF BUILDINGS AND AVERAGE BUILDING SIZE

Region	No. of Buildings	Ave. Building Area (SF)
NE	16	345,191
SE	3	169,281
MW	9	107,473
SW	4	68,048
W	16	80,621

The samples are clearly weighted to the Northeast region. This weighting mirrors the national office market to a certain extent, although, it is likely to be somewhat extreme. Considering the size of the samples, the West region may be slightly under-weighted in comparison to the national office market.

Urban/Suburban Mix

Both the five and ten year holding period samples contain significantly more suburban than urban buildings. However, due to the much larger size of most modern urban office buildings, these samples contain more urban than suburban building area. The following table illustrates how the average size of the urban buildings in the samples are three to four times as great as the average size of the suburban buildings.

Table 4-5

FIVE AND TEN YEAR HOLDING PERIODS
URBAN/SUBURBAN MIX
NUMBER OF BUILDINGS AND AVERAGE BUILDING SIZE

	URBAN		SUBURBAN	
Sample	**# of Buildings**	**Avg. Building SF**	**# of Buildings**	**Avg. Building SF**
5 Year Hold	41	438,985	113	124,460
10 Year Hold	14	397,908	34	87,929

The building area is more heavily weighted toward urban space in the ten year sample (Figure 4-8) as compared to the five year sample (Figure 4-7). The urban/suburban mix is presented in the following charts.

Figure 4-7

FIVE YEAR HOLDING PERIOD SAMPLE

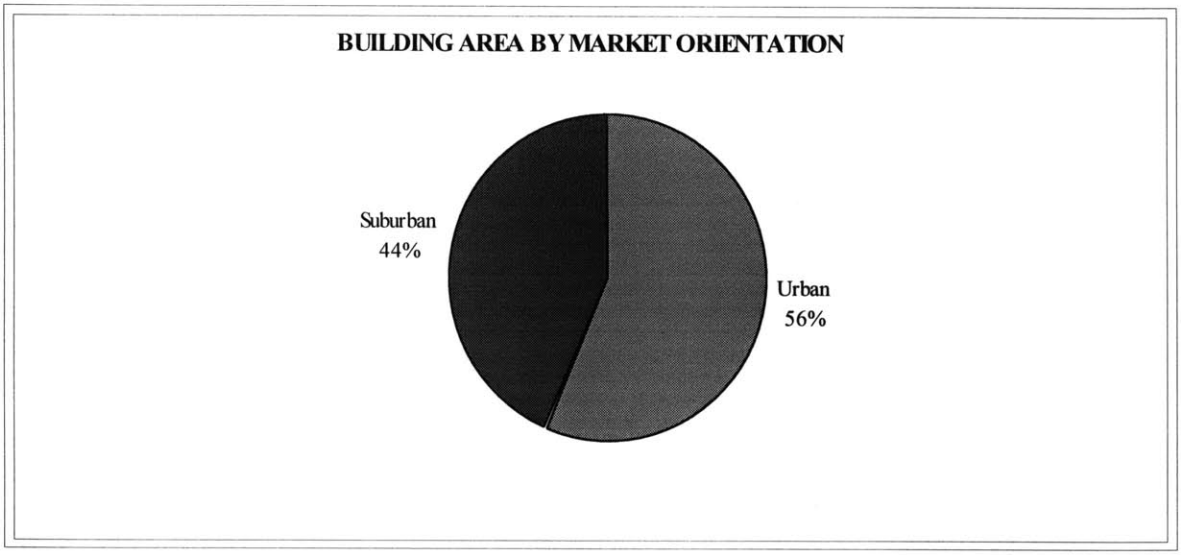
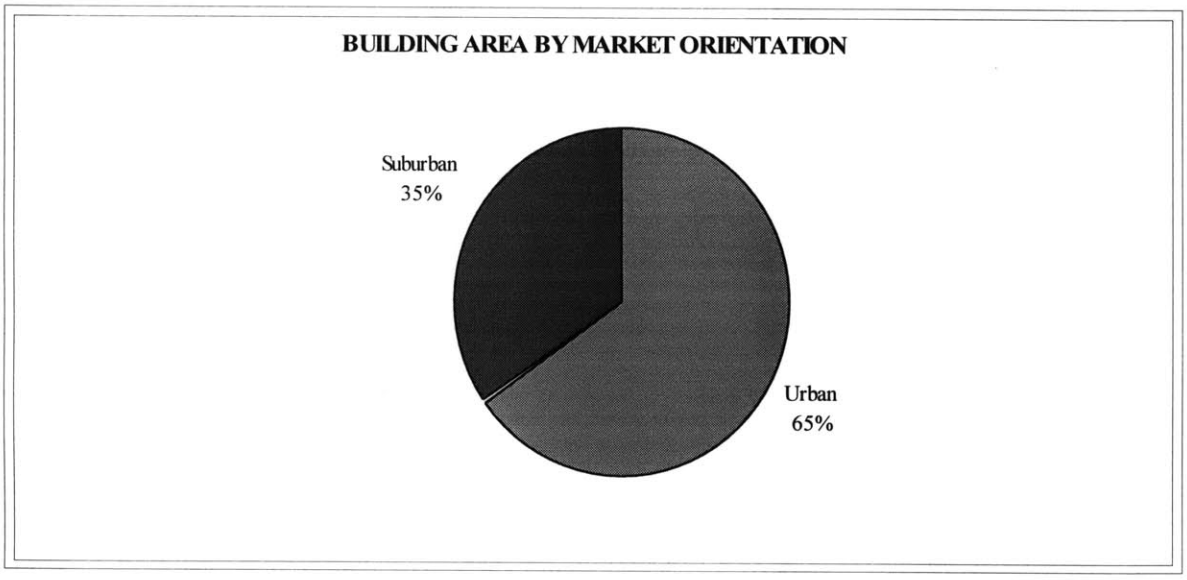


Figure 4-8

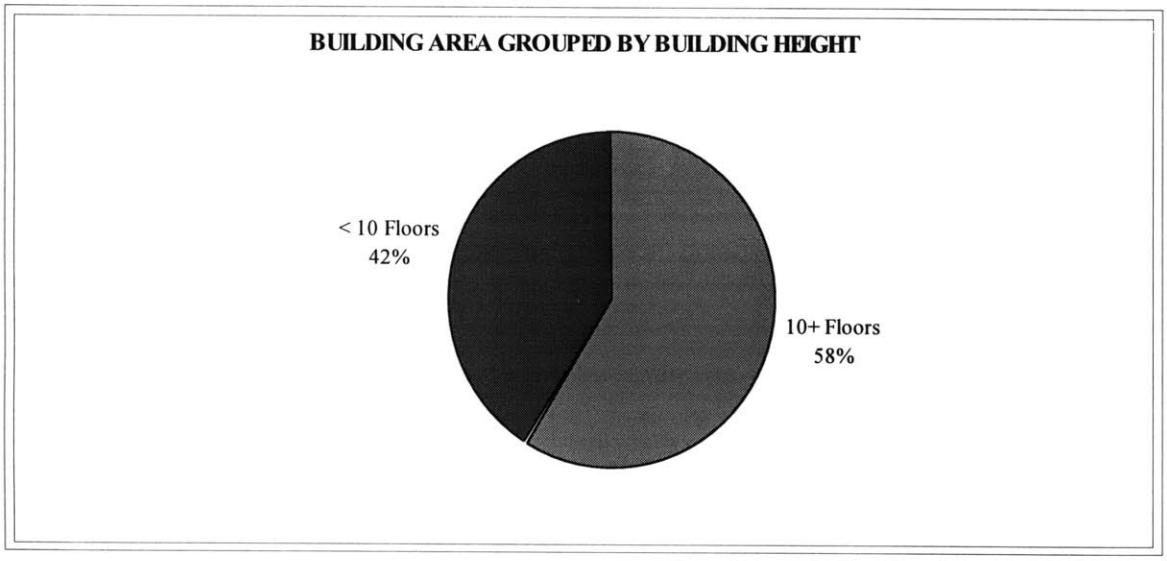
TEN YEAR HOLDING PERIOD SAMPLE



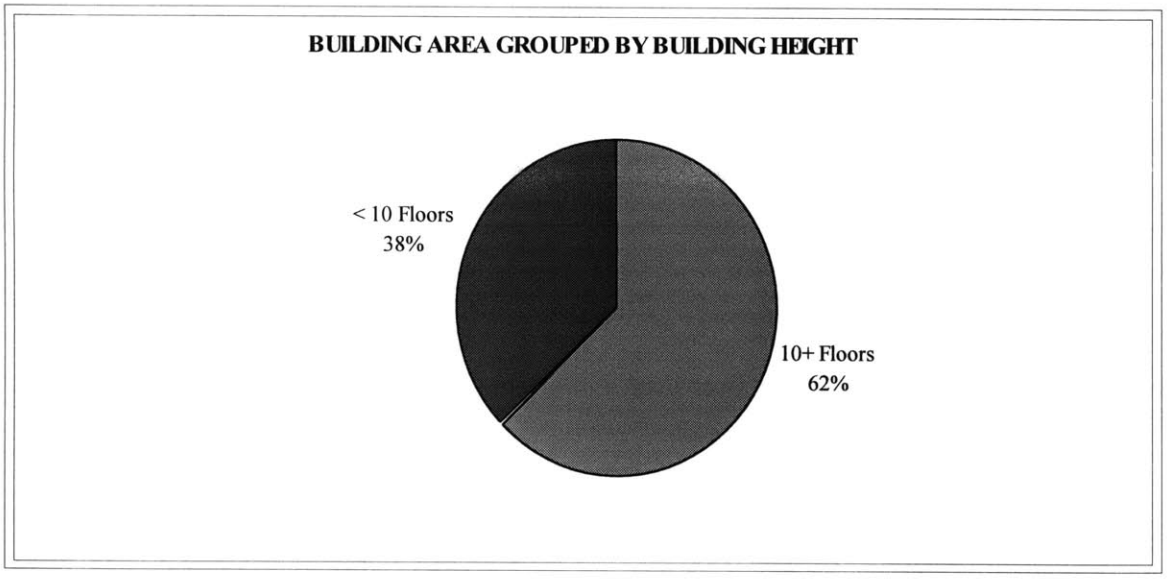
Building Height

The buildings were organized into two groups based on building height. The categories are buildings with greater than ten floors and buildings with less than ten floors. The distribution of the buildings by height in the five and ten year holding period samples are summarized in the following graphs.

FIVE YEAR HOLDING PERIOD SAMPLE



TEN YEAR HOLDING PERIOD SAMPLE



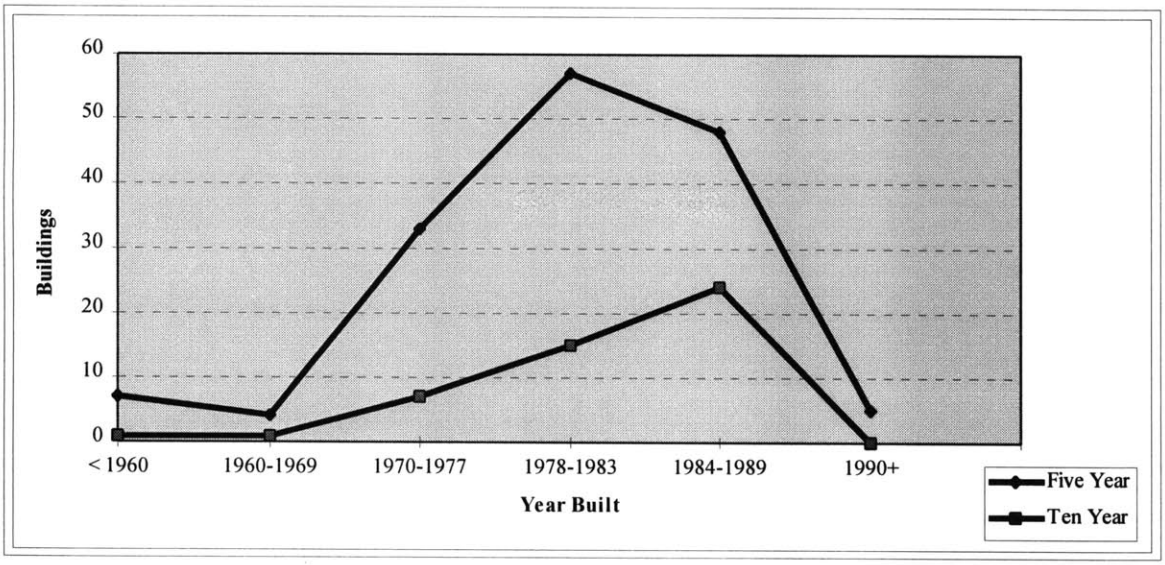
Over 58 percent of the building area in both samples is contributed by buildings of over ten floors in height. However, in terms of number of buildings, less than 30 percent of the buildings in each sample contain over ten floors.

Year Built

In terms of year built, the five year holding period sample forms a bell curve around the period 1978 to 1983 (see Figure 4-9). This time period does not, however, contribute the highest percentage of building area in the five year sample (see Figure 4-10). The ten year holding period sample forms a bell curve around the period 1984 to 1989, which does contribute the highest percentage of building area.

Figure 4-9

DISTRIBUTION OF BUILDINGS BY YEAR BUILT
FIVE AND TEN YEAR HOLDING PERIOD SAMPLES



The majority of building area in both the five and ten year holding period samples is contributed by buildings constructed during the period 1984 to 1989 (Figures 4-10 and 4-11). The percentage share of building area from the 1970 to 1977 bracket falls considerably from the five to ten year holding period (26% to 7%).

Figure 4-10

FIVE YEAR HOLDING PERIOD SAMPLE

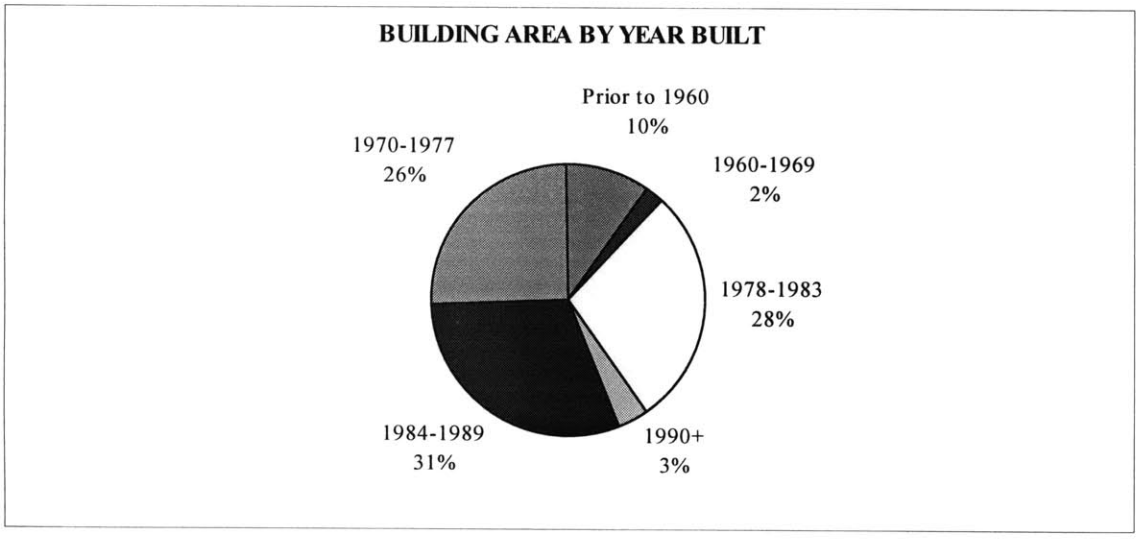
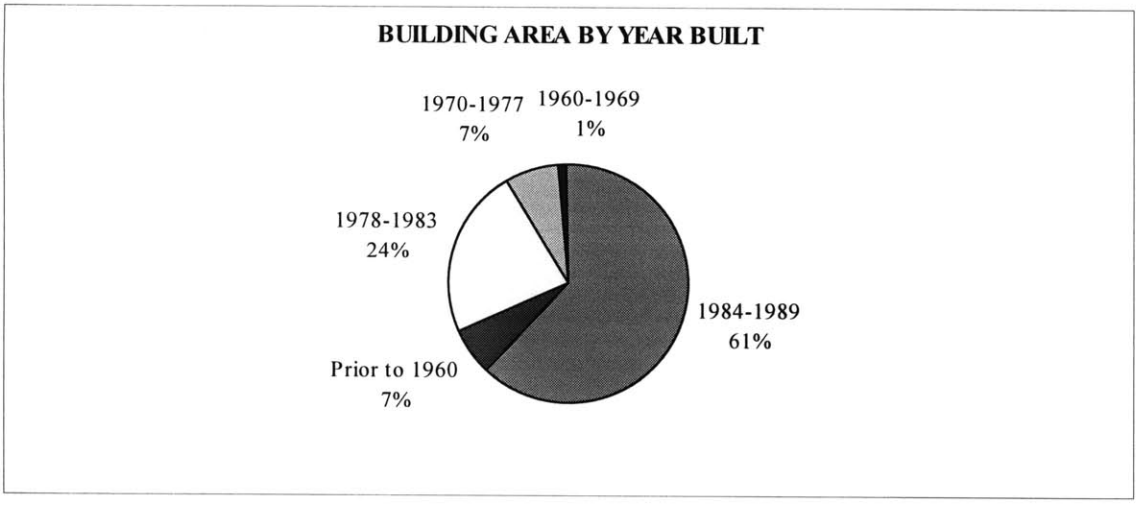


Figure 4-11

TEN YEAR HOLDING PERIOD SAMPLE



Strengths and Weaknesses of the Data

The strength of the data sample is reflected by its magnitude and diversity in geographic distribution, urban/suburban mix, building size, building height, and year built. Although geographically weighted to the Northeast region of the United States, the author believes the sample reflects a fair cross-section of the nation's office building stock. The data has been derived from well-respected real estate companies representing prudent property owners. Therefore, the data is believed to reflect realistic capital expenditure levels representative of typical institutional ownership.

Due to the limited time frame for this study, no auditing or other verification of the provided data was undertaken. Each source confirmed that the information provided fit the supplied definition of capital expenditures. Where possible, for specific instances of abnormal costs, an effort was made to gain additional detail on the cost components. Generally, the sources did not have the capability to provide detail on specific data points for years prior to 1990. Nevertheless, several adjustments were made to the data based on more detailed research.

Specific cost items which are likely to be included in the data which do not reflect typical ongoing capital expenditure requirements, and which could not be specifically identified, include asbestos removal and other environmental expenditures, Americans with Disabilities Act (ADA) compliance, installation of fire sprinklers and build out of tenant spaces from raw shell to "vanilla shell", (i.e. framing and installation of exterior partitions

and ceilings and basic lighting). Asbestos removal, ADA compliance, other environmental costs and installation of fire sprinklers are likely included in the cost figures for buildings built prior to the late 1970's. Where possible these costs have been taken out of the data. The cost of build-out of tenant spaces from raw shell to vanilla shell prior to initial lease-up is considered to be a construction cost and has been removed from the data where possible. Nevertheless, it is highly likely that these costs remain in a majority of the data for buildings built prior to 1980. As such, the data analysis in Chapter 5 attempts to isolate buildings where these costs are likely to be included to provide more relevant, meaningful conclusions.

No effort was made to extract from historical records those costs falling under the capital expenditure definition which might have been expensed under allowable accounting provisions as discussed in Chapter 1. It was determined during the data gathering process that the amount of effort required for the sources to review records at that level of detail was unreasonable due to the limited time frame of the research.

Chapter 5: Data Analysis

Data Analysis

The data consists of property information and historical capital expenditure amounts for a minimum of five years. The data includes information on the regional location of the building, year built, year renovated, number of buildings (if a complex or business park), height (number of floors), and net building area. In addition, for each year of data, a single capital expenditure amount was provided. Changes in the net rentable area of the building were also provided.

The data was compiled in a database, where the annual capital expenditure amounts were converted into a cost per square foot based on the net rentable area of the building in the year the expense was reported. For comparison purposes, the capital expenditure amounts were adjusted into constant dollars through application of an inflation multiplier. The multiplier was based on the consumer price index for all urban consumers (CPI-U) which is published by the U.S. Department of Labor. Based on the CPI-U, the following multipliers were applied, adjusting the figures into 1996 constant dollars.

Table 5-1

HISTORICAL CAPITAL EXPENDITURE INFLATION MULTIPLIERS

Data from Year	Multiplier
1981	1.73
1982	1.63
1983	1.58
1984	1.51
1985	1.46
1986	1.43
1987	1.38
1988	1.33
1989	1.27
1990	1.20
1991	1.15
1992	1.12
1993	1.09
1994	1.06
1995	1.03

Source: U.S. Department of Labor.

An example of how the inflation multiplier was applied is as follows. Consider a building with a reported capital expenditure cost of $0.50 per square foot in 1990. As the table below illustrates, the multiplier converts the reported cost into 1996 constant dollars of $0.60 per square foot.

Table 5-2

INFLATION MULTIPLIER ADJUSTMENT TO CAPITAL EXPENDITURES SAMPLE CALCULATION

Cost in 1990	$0.50
Multiplier	X 1.20
Cost in Constant Dollars (1996)	$0.60

As discussed in the previous chapter, the data was organized into groupings based on the number of years of consecutive capital expenditure information provided. Two samples were generated, one with a five year holding period and one with a ten year holding period.

The five year holding period contains the first five years of capital expenditure data provided for each property in the sample. As shown in Table 5-3, in the five year holding period sample, the inflation adjusted capital expenditures for Building 1 are based on capital expenditures made during the period 1989 through 1993, while the inflation adjusted capital expenditures for Building 70 are based on expenditures made between 1991 and 1995.

Table 5-3

SAMPLE OF TIME SERIES EXPENDITURES FOR INDIVIDUAL PROPERTIES
CAPITAL EXPENDITURES PER SQUARE FOOT OF BUILDING AREA
FIVE YEAR HOLDING PERIOD SAMPLE
(All Figures in 1996 Dollars)

Building 1

	1989	1990	1991	1992	1993
Cap. Exp. Per SF	$0.00	$0.00	$0.24	$0.01	$0.32

Building 70

	1991	1992	1993	1994	1995
Cap. Exp. Per SF	$0.00	$0.00	$0.00	$0.71	$1.13

For those buildings with ten years of data, the first five inflation adjusted capital expenditure amounts are those used in the five year holding period sample; however, in the ten year holding period sample also includes inflation adjusted expenditures for the succeeding five years. As such, buildings in the ten year holding period sample share five years of data with the five year holding period sample.

For any grouping of data in the samples, two results are calculated: Mean Annual Base Building Cost and Weighted Average Annual Base Building Cost. The methods for calculating these two measures are described in the following section using a five year holding period sample comprised of Buildings 1 and 70 (introduced previously).

Mean Annual Base Building Cost

Calculating the mean base building cost is a little more straight forward than the previous calculation. In this case, the inflation adjusted base building expenditure amounts per square foot for all the buildings in the sample are summed over the holding period and divided by the product of the number of buildings in the sample multiplied by the holding period of the sample. The formula is as follows:

Figure 5-1

$$\text{Mean Annual Base Building Cost} = \frac{\sum \text{inflation adjusted capital expenditures per SF}}{\sum \text{buildings X holding period of the sample}}$$

Again, using the two building sample from before, the first step is to sum the per square foot inflation adjusted capital expenditure figures for the sample.

Table 5-4

INFLATION ADJUSTED CAPITAL EXPENDITURES PER SQUARE FOOT
In 1996 Dollars

Building	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	$0.00	$0.00	$0.24	$0.01	$0.32	$0.57
70	$0.00	$0.00	$0.00	$0.71	$1.13	$1.84
Sample Total						$2.41

The sample contains a total of two buildings. To calculate the mean, the sample's total capital expenditures per square foot are divided by the number of buildings (two) multiplied by the holding period of the sample (five years). The calculation is as follows:

Figure 5-2

$$\text{Mean Annual Base Building Cost} = \frac{\$2.41}{(2 \times 5)} = \$0.24 \text{ per SF}$$

Weighted Average Annual Base Building Cost

The weighted average base building cost is calculated by dividing the sum of annual inflation adjusted capital expenditures over the holding period by the sum of annual building area for the sample over the holding period. The formula is as follows:

Figure 5-3

$$\text{Weighted Average Annual BBC} = \frac{\sum \text{inflation adjusted capital expenditures}}{\sum \text{building area}}$$

The following tables present an example of the weighted average annual base building cost for the five year sample containing Buildings 1 and 70. The first step is to sum the inflation adjusted capital expenditures for the sample as follows:

Table 5-5

INFLATION ADJUSTED CAPITAL EXPENDITURES
In 1996 Dollars

Building	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	0	0	170,493	6,710	225,849	403,052
70	0	0	0	156,569	249,386	405,955

Next, the aggregate annual building area for the sample is calculated.

Table 5-6

BUILDING AREA

Building	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	710,000	710,000	710,000	710,000	710,000	3,550,000
70	221,000	221,000	221,000	221,000	221,000	1,105,000

The last step is to plug the summed inflation adjusted base building cost and building area figures into the weighted average annual base building cost formula as follows.

Table 5-7

CALCULATION OF SAMPLE WEIGHTED AVERAGE BASE BUILDING COST (BBC)
EXAMPLE SAMPLE
(All Expenditures in 1996 Dollars)

	Building 1	Building 70	Sample Total
Inflation Adj. BBC	$403,052	$405,955	$809,007
Building Area (SF)	3,550,000	1,105,000	4,655,000
Weighted Avg. BBC (per SF)			$0.17

In this example, the weighted average base building cost for the sample is slightly lower than the sample's mean base building cost. This contrast provides an example of the relative impact that building size can have on the weighted average calculation. In this case, the data implies that smaller buildings incurred higher annual base building costs per square foot.

Chapter 6: Results of the Data Samples

In the next two chapters, the data sample results are presented for both the five year and ten year holding period groupings. The overall results are broken down to subsections which isolate different characteristics of the buildings in the sample. These subsections are as follows:

- *The Base Result*
- *Building Year Built (Completed)*
- *Building Age at Start of Holding Period*
- *Market Orientation (Urban versus Suburban)*
- *Building Height*
- *Building Size; and*
- *Geographic Region*

In this chapter, a discussion of the results differentiated by the various building characteristics is presented. In the following chapter, the base result and how it relates to an estimate of a replacement reserve is discussed.

Data Sample Results by Building Characteristics

The following discussion focuses on relationships indicated by the data sample results when differentiated by various building characteristics. These characteristics include: year built, building age at the start of the holding period, market orientation, building height, building size and geographic location. To provide a reference point when considering the results of the samples as differentiated by building characteristics, the "base case" results are presented in the following table.

Table 6-1

SAMPLE RESULTS BY HOLDING PERIOD
BBC PER SQUARE FOOT

Sample	Number of Buildings	Net Rentable Square Feet	Weighted Average BBC	Mean BBC
Five Year Hold	154	32,062,308	$1.28	$0.94
Ten Year Hold	48	8,560,291	$1.31	$0.88

Year Built and Age at Start of Holding Period

The table on the following page summarizes the results of the five and ten year holding period samples when broken down by year built and age at the start of the holding period.

Table 6-2

BREAKDOWN BY YEAR BUILT AND AGE AT START OF HOLD

FIVE YEAR HOLDING PERIOD

BREAKDOWN BY YEAR BUILT

Year Built	No. of Buildings	Net Area (SF)	Weighted Ave. BBC	Mean BBC
1990+	5	1,108,711	0.23	0.27
1987-1989	15	3,067,295	0.24	0.33
1984-1986	33	6,702,943	0.46	0.41
1981-1983	44	6,974,870	0.84	0.89
1978-1980	13	2,112,498	0.91	0.99
1975-1977	8	1,424,457	0.98	0.96
1970-1974	25	6,838,504	2.83	1.85
1960-1969	4	692,244	1.99	1.55
Prior to 1960	7	3,140,786	2.27	1.92
Total	154	32,062,308	1.28	0.94

AGE AT START OF HOLD

Age at Start	No. of Buildings	Net Area (SF)	Weighted Ave. BBC	Mean BBC
0-2	39	7,363,133.0	0.22	0.29
3-5	27	5,036,676.0	0.65	0.72
6-8	37	6,733,991.0	0.88	0.93
9-11	10	1,744,816.0	1.50	1.28
12-14	7	1,700,644.0	3.35	1.47
15-17	12	3,329,217.0	1.98	1.23
18-20	13	2,607,536.0	2.74	1.96
21-23	2	405,509.0	2.67	1.72
24+	7	3,140,786.0	2.27	1.92
Total Sample	154	32,062,308.0	1.28	0.94

TEN YEAR HOLDING PERIOD

BREAKDOWN BY YEAR BUILT

Year Built	No. of Buildings	Net Area (SF)	Weighted Ave. BBC	Mean BBC
1990+	0	-	-	-
1987-1989	1	219,668	0.11	0.11
1984-1986	23	4,016,075	0.27	0.35
1981-1983	9	633,317	0.79	0.83
1978-1980	6	994,662	0.43	0.66
1975-1977	2	493,383	1.59	2.11
1970-1974	5	1,676,223	4.33	2.93
1960-1969	1	76,963	1.75	1.75
Prior to 1960	1	450,000	2.19	2.19
Total	48	8,560,291	1.31	0.88

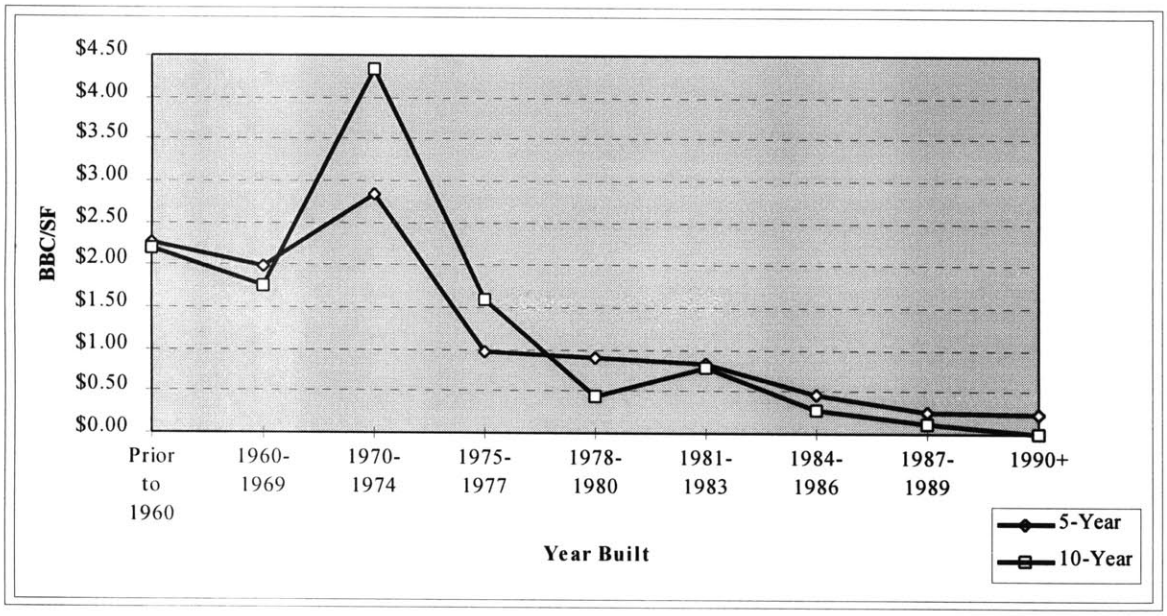
AGE AT START OF HOLD

Age at Start	No. of Buildings	Net Area (SF)	Weighted Ave. BBC	Mean BBC
0-2	24	4,210,542	0.27	0.40
3-5	13	1,545,603	0.49	0.62
6-8	3	562,499	1.50	1.70
9-11	2	457,377	4.39	2.93
12-14	1	769,570	5.99	5.99
15-17	3	487,737	1.40	1.32
18-20	1	76,963	1.75	1.75
21-23	0	-	-	-
24+	1	450,000	2.19	2.19
Total Sample	48	8,560,291	1.31	0.88

Focusing on the breakdown by year built, the data suggests that older buildings require greater capital expenditures than more recently constructed buildings. Figure 6-1 graphically illustrates how the earlier period groupings have higher per square foot costs than the more recent period buildings in both the five and ten year holding period samples.

Figure 6-1

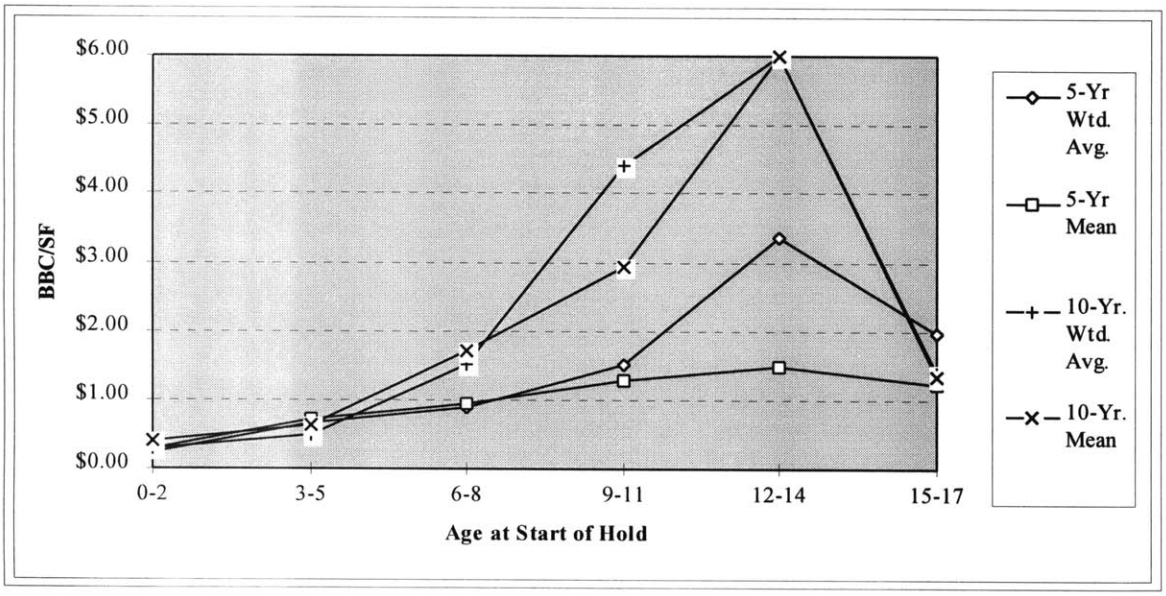
BREAKDOWN OF BASE BUILDING CAPITAL EXPENDITURES BY YEAR BUILT
FIVE AND TEN YEAR HOLDING PERIOD SAMPLES
WEIGHTED AVERAGE BASE BUILDING COSTS



The data also suggests that capital expenditures increase as a building ages. This point is illustrated by Figure 6-2, which presents the data by building age at the start of the holding period. For both the five and ten year holding period samples, the trend lines generally slope upwards.

Figure 6-2

BREAKDOWN OF BASE BUILDING CAPITAL EXPENDITURES
BY AGE AT START OF HOLDING PERIOD
FIVE AND TEN YEAR HOLDING PERIOD SAMPLES



Urban Versus Suburban

The data was also organized by market orientation to test for differences in capital expenditures at buildings with urban locations versus buildings with suburban locations. The following table presents the results for the samples when organized by market orientation (urban versus suburban).

Table 6-4

SAMPLE RESULTS BY HOLDING PERIOD
BBC PER SQUARE FOOT BY MARKET ORIENTATION

	URBAN				SUBURBAN			
Sample	**# Bldgs.**	**NRSF**	**Wghtd. Avg.**	**Mean**	**# Bldgs.**	**NRSF**	**Wghtd. Avg.**	**Mean**
5 Year	41	17,998,372	$1.69	$1.50	113	14,063,936	$0.76	$0.74
10 Year	14	5,570,718	$1.62	$1.32	34	2,989,573	$0.73	$0.70

Notes: Bldgs. = buildings. NRSF = net rentable square feet. Wghtd. Avg. = weighted average.

The results suggest that suburban buildings require lower capital expenditures than urban buildings. The weighted average capital expenditure amounts for suburban buildings in both samples are approximately 45 percent of the capital expenditure amounts for urban buildings. This is not a surprising result considering that urban buildings typically have underground or structured parking which generally costs more to repair or replace than surface parking lots at suburban buildings. In addition, as the tables on the following page illustrate, the urban buildings in the sample are generally older than the suburban buildings (especially in the five year holding period sample). In the previous section, the data results suggested that capital expenditures are higher at older buildings than newer buildings.

Table 6-5

MARKET ORIENTATION BY YEAR BUILT AND AGE AT START OF HOLDING PERIOD

FIVE YEAR HOLDING PERIOD

URBAN VS. SUBURBAN BY YEAR BUILT

	Urban				Suburban			
Building Year Built	# Bldgs.	NRA	Wtd. Ave BBC	Mean BBC	# Bldgs.	NRA	Wtd. Ave BBC	Mean BBC
1990+	3	890,426	0.28	0.44	2	218,285	0.01	0.02
1987-1989	2	1,215,000	0.18	0.20	13	1,852,295	0.28	0.35
1984-1986	7	3,668,803	0.26	0.26	26	3,034,140	0.70	0.45
1981-1983	4	1,587,562	1.06	1.05	40	5,387,308	0.78	0.87
1978-1980	4	1,398,999	0.78	0.52	9	713,499	1.17	1.20
1975-1977	1	315,327	0.09	0.09	7	1,109,130	1.23	1.09
1970-1974	12	5,466,969	3.30	2.91	13	1,371,535	0.97	0.87
1960-1969	1	314,500	3.44	3.44	3	377,744	0.78	0.92
Prior to 1960	7	3,140,786	2.27	1.92	0	-	-	-
Total	41	17,998,372	1.69	1.50	113	14,063,936	0.76	0.74

URBAN VS. SUBURBAN BY AGE AT START OF HOLD

	Urban				Suburban			
Age at Start	# Bldgs.	NRA	Wtd. Ave BBC	Mean BBC	# Bldgs.	NRA	Wtd. Ave BBC	Mean BBC
0-2	10	4,538,926	0.22	0.29	29	2,824,207	0.24	0.29
3-5	5	1,999,932	0.28	0.25	22	3,036,744	0.89	0.83
6-8	4	1,732,828	0.93	0.93	33	5,001,163	0.87	0.93
9-11	3	1,223,347	1.63	1.44	7	521,469	1.20	1.22
12-14	1	769,570	6.51	6.51	6	931,074	0.74	0.63
15-17	7	2,950,137	2.17	1.83	5	379,080	0.43	0.38
18-20	3	1,328,346	4.29	4.44	10	1,279,190	1.14	1.21
21-23	1	314,500	3.44	3.44	1	91,009	-	-
24+	7	3,140,786	2.27	1.92	0	-	-	-
Total	41	17,998,372	1.69	1.50	113	14,063,936	0.76	0.74

TEN YEAR HOLDING PERIOD

URBAN VS. SUBURBAN BY YEAR BUILT

	Urban				Suburban			
Building Year Built	# Bldgs.	NRA	Wtd. Ave BBC	Mean BBC	# Bldgs.	NRA	Wtd. Ave BBC	Mean BBC
1990+	0	-	-	-	0	-	-	-
1987-1989	0	-	-	-	1	219,668	0.11	0.11
1984-1986	5	2,433,500	0.21	0.26	18	1,582,575	0.35	0.38
1981-1983	0	-	-	-	9	633,317	0.79	0.83
1978-1980	3	764,171	0.31	0.41	3	230,491	0.82	0.91
1975-1977	1	315,327	0.23	0.23	1	178,056	3.99	3.99
1970-1974	4	1,607,720	4.47	3.40	1	68,503	1.05	1.05
1960-1969	0	-	-	-	1	76,963	1.75	1.75
Prior to 1960	1	450,000	2.19	2.19	0	-	-	-
Total	14	5,570,718	1.62	1.32	34	2,989,573	0.73	0.70

URBAN VS. SUBURBAN BY AGE AT START OF HOLD

	Urban				Suburban			
Age at Start	# Bldgs.	NRA	Wtd. Ave BBC	Mean BBC	# Bldgs.	NRA	Wtd. Ave BBC	Mean BBC
0-2	5	2,433,500	0.21	0.26	19	1,777,042	0.36	0.43
3-5	3	764,171	0.31	0.41	10	781,432	0.67	0.69
6-8	1	315,327	0.23	0.23	2	247,172	3.12	2.43
9-11	1	418,916	4.69	4.69	1	38,461	1.17	1.17
12-14	1	769,570	5.99	5.99	0	-	-	-
15-17	2	419,234	1.46	1.46	1	68,503	1.05	1.05
18-20	0	-	-	-	1	76,963	1.75	1.75
21-23	0	-	-	-	0	-	-	-
24+	1	450,000	2.19	2.19	0	-	-	-
Total	14	5,570,718	1.62	1.32	34	2,989,573	0.73	0.70

Building Size

To analyze the effect, if any, of building size on capital expenditure amounts, the sample results were organized into five building size categories as presented in the table below. The following two tables present the results of organizing the data by building size.

Table 6-6

FIVE YEAR HOLDING PERIOD SAMPLE
BBC PER SQUARE FOOT BY BUILDING SIZE

Building Size (SF)	Number of Buildings	Net Rentable Square Feet	Weighted Average BBC	Mean BBC
< 100,000	53	3,624,482	$0.82	$0.76
100,000 to 249,999	53	7,701,209	$0.79	$0.74
250,000 to 499,999	21	7,741,907	$1.20	$1.20
500,000 to 999,999	26	11,941,710	$1.66	$1.45
> 1,000,000	1	1,053,000	$2.81	$2.81
Total	154	36,062,308	$1.28	$0.94

Table 6-7

TEN YEAR HOLDING PERIOD SAMPLE
BBC PER SQUARE FOOT BY BUILDING SIZE

Building Size (SF)	Number of Buildings	Net Rentable Square Feet	Weighted Average BBC	Mean BBC
< 100,000	23	1,288,524	$0.74	$0.67
100,000 to 249,999	13	1,868,867	$0.77	$0.77
250,000 to 499,999	7	2,303,330	$1.62	$1.46
500,000 to 999,999	5	3,099,570	$1.64	$1.36
> 1,000,000	0	0	$0.00	$0.00
Total	48	8,560,291	$1.31	$0.88

The results suggest that buildings greater than 250,000 square feet require approximately twice the capital expenditure costs of buildings smaller than 250,000 square feet. To confirm the relative significance of building size, the samples were further differentiated to account for differences in building age. Table 6-8 presents the results of the data samples when differentiating between buildings containing less than 250,000 square feet and buildings containing 250,000 square feet or more and buildings11 years old or less at the start of the holding period and buildings older than 11 years at the start of the holding period.

Table 6-8

FIVE YEAR HOLDING PERIOD SAMPLE
ANNUAL BASE BUILDING COSTS
BY SIZE AND AGE AT START OF HOLDING PERIOD

	Age at Start of Holding Period					
	11 Years or Less			> 11 Years		
Building Size (SF)	**Buildings**	**Wtd.-Avg.**	**Mean**	**Buildings.**	**Wtd.-Avg.**	**Mean**
< 250,000	90	$0.71	$0.71	16	$1.21	$0.95
> 250,000	23	$0.58	$0.59	25	$2.73	$2.08

The more detailed analysis suggests that it is building age and not building size that influences capital expenditures. In the case of the five year holding period sample, for buildings which were 11 years old or less at the start of the holding period, the BBC figures are actually lower for buildings over 250,000 square feet. The mean annual BBC figures are 1.3 to 3.5 times higher at the buildings greater than 11 years old at the start of the holding period then the buildings 11 years old or less at the start of the holding period.

Building Height

To analyze the effect of building height, the data was organized into two groups: Buildings greater than ten floors in height and building less than ten floors in height.

Table 6-9

SAMPLE RESULTS BY HOLDING PERIOD
BY BUILDING HEIGHT
BBC PER SQUARE FOOT

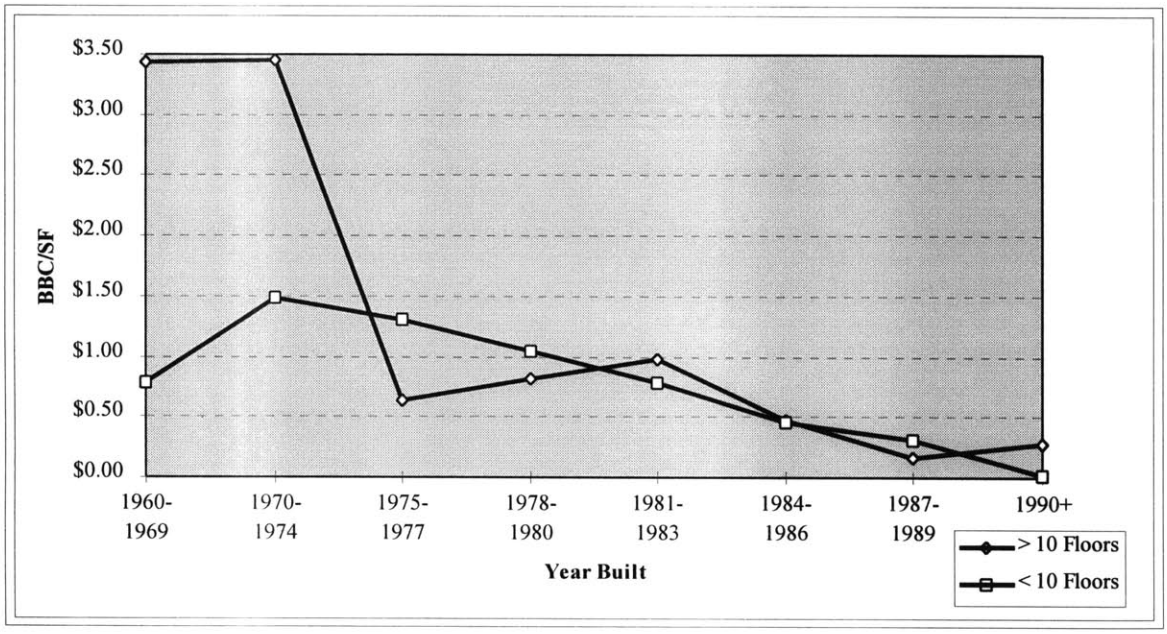
	Greater than 10 Floors				Less than 10 Floors			
Sample	**# Bldgs.**	**NRSF**	**Wghtd. Avg.**	**Mean**	**# Bldgs.**	**NRSF**	**Wghtd. Avg.**	**Mean**
5-Year	42	18,705,357	$1.62	$1.38	112	13,356,951	$0.81	$0.78
10-Year	12	5,347,674	$1.66	$1.44	36	3,212,617	$0.72	$0.70

Notes: Bldgs. = buildings. NRSF = net rentable square feet. Wghtd. Avg. = weighted average.

The overall results of the two samples strongly suggest that buildings greater than ten floors in height have higher capital expenditure costs than buildings less than ten floors in height. To further analyze this issue, the sample data was broken down by year built within both the building height categories. If building height influences capital expenditures, within each year built group, buildings with greater than ten floors should have higher BBCs than buildings with less than ten floors.

Figure 6-4

BREAKDOWN OF BASE BUILDING CAPITAL EXPENDITURES
WEIGHTED AVERAGE BBC BY BUILDING HEIGHT
FIVE YEAR HOLDING PERIOD SAMPLE



As Figure 6-4 illustrates, this analysis does not provide the expected result. The data is fairly evenly distributed over the different year built periods. As such, there is no clear pattern supporting that building height influences base building capital expenditures. Due to the discrepancy between the general results and the breakdown by year built, a definitive conclusion can not be reached on the impact of building height on capital expenditures at commercial office properties.

Geographic Region

To determine if geographic location impacts capital expenditures, the data was categorized into five regions based on each building's location within the United States. The geographic boundaries utilized for this analysis were defined in Chapter 5. Table 6-11 presents the results of the five and ten year holding period samples when organized by geographic region.

Table 6-10

SAMPLE RESULTS BY HOLDING PERIOD
DATA ORGANIZED BY GEOGRAPHIC REGION
BBC PER SQUARE FOOT

	Five Year Holding Period				Ten Year Holding Period			
Region	**# Bldgs.**	**NRSF**	**Wghtd. Avg.**	**Mean**	**# Bldgs.**	**NRSF**	**Wghtd. Avg.**	**Mean**
NE	55	15,320,251	$1.64	$1.15	16	5,523,061	$1.21	$0.86
SE	8	1,439,937	$1.82	$0.95	3	507,843	$3.88	$1.60
MW	41	7,465,306	$0.92	$1.06	9	967,260	$1.23	$1.24
SW	19	2,617,211	$0.63	$0.57	4	272,192	$1.16	$0.98
W	31	5,219,603	$0.93	$0.64	16	1,289,935	$0.81	$0.55

Notes: Bldgs. = buildings. NRSF = net rentable square feet. Wghtd. Avg. = weighted average.

The results suggest that some geographic differences exist; however, not all regions are equally represented. In addition, the buildings contained within each region have widely varied characteristics which make comparison cumbersome. Additional analysis was undertaken, breaking down the geographic categories by other characteristics, to test for

consistent geographic differences. This analysis included breaking down the geographic regions by year built, age at the start of the holding period, building size, etc. Generally, no clear patterns supporting regional differences could be identified through this additional analysis. In addition, broken down to such a high level of detail, the results would be considered statistically tenuous due to the few data points supporting the results.

Chapter 7: Explaining the Base Result

The Base Result

The overall results for the two holding periods are highlighted in the following table.

Table 7-1

DATA SAMPLE RESULTS BY HOLDING PERIOD
BBC PER SQUARE FOOT

Sample	Number of Buildings	Net Rentable Square Feet	Weighted Average BBC	Mean BBC
Five Year Holding Period	154	32,062,308	$1.28	$0.94
Ten Year Holding Period	48	8,560,291	$1.31	$0.88

The most striking feature of the base results is the magnitude of the overall historical base building capital expenditures. In Chapter 4, replacement reserve "rules of thumb" were presented indicating typical reserves of $0.10 to $0.50 per square foot. The mean and weighted average base building costs from the five and ten year holding period samples suggest that in actuality, capital expenditures are two to ten times greater than the "rules of thumb." However, to fully understand this variance requires a deeper look.

It is the author's belief that the replacement reserve "rules of thumb" presented in Chapter 4 relate to more recently built, higher quality office properties; that is buildings built within the last ten to 15 years. A closer look at the data results, focusing exclusively on those buildings built since 1983, provides the following figures.

Table 7-2

DATA SAMPLE RESULTS BY HOLDING PERIOD
BUILDINGS CONSTRUCTED AFTER 1983
BBC PER SQUARE FOOT

Sample	Number of Buildings	Net Rentable Square Feet	Weighted Average BBC	Mean BBC
Five Year Holding Period	53	10,878,949	$0.37	$0.37
Ten Year Holding Period	24	4,235,743	$0.26	$0.34

Analyzing the results of this more detailed breakdown suggests that currently applied replacement reserve estimates for buildings constructed after 1983 are reasonable. The low end of the range indicated by the "rules of thumb" may be too low, but the data results support real estate industry participants applying replacement reserves ranging from $0.20 to $0.50 per square foot.

Based on the conclusion for more recently constructed buildings, the opposite must be concluded for older buildings. Table 7-3 presents the data results for buildings built prior to 1984.

Table 7-3

DATA SAMPLE RESULTS BY HOLDING PERIOD
BUILDINGS CONSTRUCTED PRIOR TO 1984
BBC PER SQUARE FOOT

Sample	Number of Buildings	Net Rentable Square Feet	Weighted Average BBC	Mean BBC
Five Year Holding Period	101	21,183,359	$1.75	$1.24
Ten Year Holding Period	24	4,324,548	$2.34	$1.42

The data results presented in Table 7-3 indicate that BBCs for buildings built prior to 1984 are significantly higher than the "rule of thumb" replacement reserves. Although lack of disclosure may provide a reason for a lack of information on appropriate replacement reserve estimates for older buildings, the magnitude of the discrepancy is significant.

Prior to discussing the implication of these results, further consideration is required. In the discussion of the data sample presented at the end of Chapter 4, it was mentioned that older buildings, constructed prior to 1978, have required capital expenditures for items such as asbestos removal, sprinkler installation and ADA compliance. Therefore, an additional breakdown of the data was made, delineating those buildings constructed after 1977 and before 1984. The results are presented in Tables 7-4 and 7-5.

Table 7-4

DATA SAMPLE RESULTS BY HOLDING PERIOD
BUILDINGS CONSTRUCTED PRIOR TO 1984 AND AFTER 1977
BBC PER SQUARE FOOT

Sample	Number of Buildings	Net Rentable Square Feet	Weighted Average BBC	Mean BBC
Five Year Holding Period	57	9,087,368	$0.86	$0.91
Ten Year Holding Period	15	1,627,979	$0.57	$0.76

Table 7-5

DATA SAMPLE RESULTS BY HOLDING PERIOD
BUILDINGS CONSTRUCTED PRIOR TO 1978
BBC PER SQUARE FOOT

Sample	Number of Buildings	Net Rentable Square Feet	Weighted Average BBC	Mean BBC
Five Year Holding Period	44	12,095,991	$2.42	$1.67
Ten Year Holding Period	9	2,696,569	$3.41	$2.52

The further delineation indicates that in comparison to buildings constructed after 1983, BBCs are slightly higher at buildings constructed after 1977 and prior to 1984. In addition, the further analysis clarifies that buildings constructed prior to 1978 have experienced significantly higher BBCs than the newer buildings.

The implications of the results are clearly illustrated in Table 7-6, which presents the weighted average BBC results for the five and ten year data samples for the year built groupings as a percent of varying levels of net operating income per square foot.

Table 7-6

FIVE AND TEN YEAR HOLDING PERIOD SAMPLES
VARIOUD BUILDING YEAR BUILT GROUPINGS
WEIGHTED AVERAGE BBC RESULTS AS A PERCENT OF NET OPERATING INCOME

	Five Year Holding Period			Ten Year Holding Period		
Year Built	**After 1983**	**1978 to 1984**	**Before 1978**	**After 1983**	**1978 to 1984**	**Before 1978**
Net Rent/SF	**$0.37**	**$0.86**	**$2.42**	**$0.26**	**$0.57**	**$3.41**
$5.00	7%	17%	48%	5%	11%	68%
$7.50	5%	11%	32%	3%	8%	45%
$10.00	4%	9%	24%	3%	6%	34%
$12.50	3%	7%	19%	2%	5%	27%
$15.00	3%	6%	16%	2%	4%	23%
$17.50	2%	5%	14%	2%	3%	19%
$20.00	2%	4%	12%	1%	3%	17%

Based on net operating income levels of between $5.00 and $20.00 per square foot, the results of the data samples suggest that BBCs account for between 1 and 68 percent of net operating income. Recalling Table 1-4, which presented historical base building capital expenditures for Boston Properties, Inc., BBCs as a percentage of net operating income ranged from 1.2 to 1.6 percent. The results of the buildings built after 1983, at net operating income levels of greater than $15.00 per square foot, generally support the levels indicated by Boston Properties, Inc.

The weighted average BBC for buildings constructed between 1977 and 1984 suggest that the "rule of thumb" replacement reserve estimates are slightly understated for buildings of this vintage. The figures in Table 7-6 suggest that BBCs as a percentage of

net operating income can be as high as 17 percent for buildings constructed between 1977 and 1984. This is significantly higher than the range for the buildings built after 1983. Application of "rule of thumb" replacement reserves in the underwriting of buildings in this group, will likely lead to below pro forma investment returns.

The weighted average BBC for buildings constructed prior to 1978 indicates that BBCs account for between 12 and 68 percent of net operating income. It is the author's belief that these costs are high because they contain expenditures for items such as asbestos removal, sprinkler installation, ADA compliance and renovation, which are not likely to be incurred by newer buildings, even as they age. Nevertheless, the high costs indicated for buildings built prior to 1978 suggest the application of a separate set of considerations when estimating replacement reserves. As such, the "rule of thumb" replacement reserve estimates, which are appropriate for newer buildings, should not be considered when analyzing these older buildings.

The implications of the data results for buildings built prior to 1978 are significant. Application of "rule of thumb" reserves will result in grossly overestimated expected investment returns for buildings in this group. Further research should be undertaken to investigate if industry participants are applying separate replacement reserve estimates for buildings built prior to 1978.

Conclusion and Implications

In the preceding section, historical capital expenditures at a diverse sample of commercial office buildings were analyzed. The purpose of this analysis was to identify building characteristics which influence capital expenditures and to test the reasonableness of "rule of thumb" replacement reserve estimates for base building capital expenditures. Two data samples were researched, covering both a five year holding period and a ten year holding period. The buildings in the data samples reflected a mix of urban and suburban buildings, of varied age and class, located throughout the United States.

The primary conclusion indicated by this research, is that base building capital expenditure requirements increase as office buildings age. Therefore, investors and building owners need to take into account a building's age and condition when estimating a replacement reserve. In addition, as buildings age, BBCs will account for a significantly higher percentage of net operating income. For a REIT, which is required to distribute 95 percent of its taxable income, the implications of the data results are significant. For office investors, the results are equally important due to the potential impact on investment returns of higher than expected BBCs.

The analysis also indicated that current market "rule of thumb" replacement reserve estimates for office buildings constructed after 1983 are reasonable. The data results suggested that for buildings constructed after 1977 and prior to 1984, these "rule of thumb" estimates slightly understate actual capital expenditures. For buildings

constructed prior to 1978, the data results suggested that the "rule of thumb" replacement reserve estimates are inaccurate and unreliable. The discrepancy between actual base building capital expenditures and the "rule of thumb" reserves for buildings built prior to 1978 is so significant that the "rules" may understate actual expenditures by as much as ten times. These results suggest that a separate set of considerations be used when estimating replacement reserves for buildings built prior to 1978.

Appendix A Reporting Requirements for Public Real Estate Entities

The following discussion provides detail on the reporting requirements of public real estate companies.

Form S-11

The Form S-11 is the primary document used for the registration of public real estate securities. The Form S-11 is used specifically for the registration of:

- *Securities issued by real estate investment trusts (REITs)*
- *Securities issued by other issuers whose business is primarily that of acquiring and holding for investment real estate or interests in real estate, or interest in other issuers whose business is primarily that of acquiring and holding real estate or interest in real estate for investment.*

Information required in Prospectus (Form S-11) includes the following:

1. Forepart of registration statement and outside front cover page of prospectus
2. Inside front and outside back cover pages of prospectus
3. Summary information, risk factors and ratio of earnings to fixed charges
4. Determination of offering price

5. Dilution
6. Selling security holders
7. Plan of distribution
8. Use of proceeds
9. Selected financial data
10. Management's discussion and analysis of financial condition and results of operations
11. General information as to registrant
12. Policy with respect to certain activities
13. Investment policies of registrant
14. Description of real estate
15. Operating data
16. Tax treatment of registrant and its security holders
17. Market price of and dividends on the registrant's common stock and related stockholder matters
18. Description of registrant's securities
19. Legal proceedings
20. Security ownership of certain beneficial owners and management
21. Directors and executive officers
22. Executive compensation
23. Certain relationships and related transactions
24. Limitations of liability

25. Financial statements and information
26. Interests of named experts and cousel
27. Disclosure of Commission position on indemnification for Securities Act liabilities.

Information not required in prospectus includes:

1. Other expenses of issuance and distribution
2. Sales to special parties
3. Recent sales of unregistered securities
4. Indemnification of directors and officers
5. Treatment of proceeds from stock being registered
6. Financial statements and exhibits
7. Undertakings

The minimum requirements for financial statement disclosure are addressed in the following section.

Financial Statements Required under Regulation S-X

The form and content of and requirements for the financial statements and financial statement schedules to be included in the Form S-11, and the date and periods for which they are required to be presented, are set forth in Regulation S-X.

Regulation S-X defines summarized financial information as follows:

"(1) Except as provided in paragraph (2), "summarized financial information" referred to in this regulation shall mean the presentation of summarized financial information as to the assets, liabilities and results of operations of the entity for which the information is required. Summarized financial information shall include the following disclosures:

(i) Current assets, noncurrent assets, current liabilities, noncurrent liabilities, and, when applicable, redeemable preferred stocks and minority interests (for specialized industries in which classified balance sheets are normally not presented, information shall be provided as to the nature and amount of major components of assets and liabilities);

(ii) Net sales or gross revenues, gross profit (or, alternatively, costs and expenses applicable to net sales or gross revenues), income or loss from continuing operations before extraordinary items and cumulative effect of a change in accounting principle, and net income or loss (for specialized industries, other information may be substituted for sales and related costs and expenses if necessary for a more meaningful presentation); and

(2) Summarized financial information for unconsolidated subsidiaries and 50 percent or less owned persons referred to in and required by Rule 10-01 (b) for interim periods shall include the information by paragraph (1)(ii) of this section."

Article 3 of Regulation S-X includes the requirements for financial statements to be included in most disclosure documents and specifies the periods to be covered by such statements. The financial statements required under Article 3 are summarized below.

1. Consolidated balance sheets - audited balance sheets for the two most recent fiscal years
2. Consolidated Statement of Income and Changes in Cash Flows - audited statements of income and cash flows for each of the three fiscal years preceding the date of the most recent audited balance sheet being filed.
3. Changes in Other Stockholders' Equity
4. Financial Statements of Businesses Acquired or to Be Acquired
5. Financial Statements Covering a Period of Nine to Twelve Months

In addition to stating the requirements for financial statements, Article 3 specifies modifications that need to be made to the basic financial statements in certain situations. These situations include two relevant requirements, a) Real estate operations acquired or to be acquired, and (b) Real estate investment trusts (REITs).

Rule 3-14 Special Instructions for Real Estate Operations (Acquired or) to Be Acquired

(a) If, during the period for which income statements are required, the registrant has acquired one or more properties which in the aggregate are significant, or since the date of the latest balance sheet required has acquired or proposes to acquire one or

more properties which in the aggregate are significant, the following shall be furnished with respect to such properties:

(1) Audited income statements (not including earnings per unit) for the three most recent fiscal years, which shall exclude items not comparable to the proposed future operations of the property such as mortgage interest, lease-hold rental, depreciation, corporate expenses and Federal and state income taxes: Provided, however, that such audited statements need be presented for only the most recent fiscal year if (i) the property is not acquired from a related party; (ii) material factors considered by the registrant in assessing the property are described with specificity in the filing with regard to the property, including sources of revenue (including, but not limited to, competition in the rental market, comparative rents, occupancy rates) and expense (including, but not limited to, utility rates, ad valorem tax rates, maintenance expenses, capital improvements anticipated); and (iii) the registrant indicates in the appropriate filing that, after reasonable inquiry, the registrant is not aware of any material factors relating to that specific property other than those discussed in response to paragraph (a)(1)(ii) of this section that would cause the reported financial information not to be necessarily indicative of future operating results.

(2) If the property is to be operated by the registrant, there shall be furnished a statement showing the estimated taxable operating results of the registrant based on the most recent 12-month period including such adjustments as can be

factually supported. If the property is to be acquired subject to a net lease the estimated taxable operating results shall be based on the rent to be paid for the first year of the lease. In either case, the estimated amount of cash to be made available by operations shall be shown. There shall be stated in an introductory paragraph the principal assumptions which have been made in preparing the statements of estimated taxable operating results and cash to be made available by operations.

(3) If appropriate under the circumstances, there shall be given in tabular form for a limited number of years the estimated cash distribution per unit showing the portion thereof reportable as taxable income and the portion representing a return of capital together with an explanation of annual variations, if any. If taxable net income per unit will become greater than the cash available for distribution per unit, that fact and approximate year of occurrence shall be stated, if significant.

(b) Information required by this section is not required to be included in a filing on Form 10-K.

Rule 3-15. Special Provision as to Real Estate Investment Trusts

"(a)(1) The income statement prepared pursuant to Rule 5-03 shall include the following additional captions between those required by Rule 5-03.15 and 16: (i) Income or loss before gain or loss on sale of properties, extraordinary items and cumulative effects of

accounting changes, and (ii) gain or loss on sale of properties, less applicable income tax. (2) The balance sheet required by Rule 5-02 shall set forth in lieu of the captions required by Rule 5-02.31 (a)(3): (i) The balance of undistributed income form other than the gain or loss on sale of properties and (ii) accumulated undistributed net realized gain or loss on sale of properties.

(b) The trust's status as a "real estate investment trust" under applicable provisions of the Internal Revenue Code as amended shall be stated in a note referred to in the appropriate statements. Such note shall also indicate briefly the principle present assumptions on which the trust has relied in making or not making provisions for Federal income taxes.

(c) The tax status of distributions per unit shall be stated (e.g. ordinary income, capital gain, return of capital)."

Level of Disclosure of Financial Statements Required Under Regulation S-X

The content of the financial statements required in Regulation S-X are governed by Generally Accepted Accounting Principles (GAAP). Under GAAP, capital expenditures are capitalized as opposed to expensed. As such, they are not required to be disclosed in any of the financial statements required under Regulation S-X. Capital expenditures may be indirectly indicated in a depreciation schedule.

Ongoing Reporting - Forms 8-K, 10-Q and 10-K

The Form S-11 is used only when issuing securities. Public companies have other reporting requirements which pertain to the ongoing performance of the business. These ongoing reports are the Forms 8-K, 10-Q and 10-K.

Form 8-K

Form 8-K is required to be filed if certain significant events occur and may be filed to report any event about which a prudent investor should know. The reportable significant events which require filing of Form 8-K include:

- *Changes in control of the registrant*
- *Acquisition or disposition of assets*
- *Bankruptcy or receivership*
- *Changes in registrant's certifying accountants*
- *Other events*
- *Resignations of registrant's directors*
- *Change in fiscal year*

When the reason for filing Form 8-K is the acquisition or disposition of assets, financial statements of the asset acquired are required. When the assets are real estate, the

financial statements and any additional information required by Rule 3-14 of Regulation S-X shall be filed (these requirements were detailed in the previous section on Form S-11).

Form 10-Q

Form 10-Q is filed quarterly and contains two parts, a financial and a special-events report. The financial information requirements of Form 10-Q consist of condensed (un-audited) financial statements and Management's Discussion and Analysis of Financial Condition and Results of Operations (MD&A). These financial statements are very limited.

Form 10-K

Form 10-K is the annual report registered by a company. In addition to other required data on the company, the following financial information is required to be reported.

- *Statement of income*
- *Balance sheet*
- *Statement of Cash Flows for the current year and three previous years*
- *Statement of capital stock and additional paid-in capital for current year and three previous years*

- *Notes to consolidated Financial Statements*
- *Consolidated real estate and accumulated depreciation*

Like the financial statements required in an S-11, these financial statements are governed by GAAP accounting standards. As such, the level of disclosure is limited in detail and excludes capital expenditures.

Appendix B: Five Year Holding Period Results

FIVE YEAR HOLDING PERIOD SAMPLE
RESULTS MATRIX
BY AGE AT START OF HOLDING PERIOD

BY MARKET ORIENTATION

Age (Yrs.) at Start of Holding Period	Urban vs. Suburban							
	URBAN				SUBURBAN			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	10	4,538,926	0.22	0.29	29	2,824,207	0.24	0.29
3 to 5	5	1,999,932	0.28	0.25	22	3,036,744	0.89	0.83
6 to 8	4	1,732,828	0.93	0.93	33	5,001,163	0.87	0.93
9 to 11	3	1,223,347	1.63	1.44	7	521,469	1.20	1.22
12 to 14	1	769,570	6.51	6.51	6	931,074	0.74	0.63
15 to 17	7	2,950,137	2.17	1.83	5	379,080	0.43	0.38
18 to 20	3	1,328,346	4.29	4.44	10	1,279,190	1.14	1.21
21 to 23	1	314,500	3.44	3.44	1	91,009	-	-
24 +	7	3,140,786	2.27	1.92	0	-	-	-
Total	41	17,998,372	1.69	1.50	113	14,063,936	0.76	0.74

BY BUILDING HEIGHT

Age (Yrs.) at Start of Holding Period	Building Height							
	Greater Than 10 Floors				Less Than 10 Floors			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	9	4,435,426	0.21	0.28	30	2,927,707	0.24	0.29
3 to 5	7	2,841,491	0.57	0.53	20	2,195,185	0.75	0.78
6 to 8	6	2,125,028	0.88	0.83	31	4,608,963	0.89	0.94
9 to 11	3	1,223,347	1.63	1.44	7	521,469	1.20	1.22
12 to 14	2	1,141,570	4.75	3.80	5	559,074	0.50	0.54
15 to 17	6	2,782,209	2.26	2.02	6	547,008	0.51	0.43
18 to 20	1	701,000	5.60	5.60	12	1,906,536	1.70	1.65
21 to 23	1	314,500	3.44	3.44	1	91,009	-	-
24 +	7	3,140,786	2.27	1.92	0	-	-	-
Total	42	18,705,357	1.62	1.38	112	13,356,951	0.81	0.78

FIVE YEAR HOLDING PERIOD SAMPLE
RESULTS MATRIX
BY AGE AT START OF HOLDING PERIOD

BY GEOGRAPHIC REGION

Age (Yrs.) at Start of Holding Period	Geographic Region							
	Northeast				Southeast			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	14	5,017,034	0.17	0.20	3	165,846	0.01	0.01
3 to 5	10	2,271,016	0.76	0.79	0	-	-	-
6 to 8	6	603,559	0.69	0.91	3	350,175	0.79	0.86
9 to 11	2	152,950	1.58	1.56	1	418,916	2.21	2.21
12 to 14	1	769,570	6.51	6.51	0	-	-	-
15 to 17	4	1,415,231	2.19	0.87	1	505,000	2.81	2.81
18 to 20	11	2,208,064	2.62	1.67	0	-	-	-
21 to 23	2	405,509	2.67	1.72	0	-	-	-
24 +	5	2,477,318	2.78	2.47	0	-	-	-
Total	55	15,320,251	1.64	1.15	8	1,439,937	1.82	0.95

Age (Yrs.) at Start of Holding Period								
	Midwest				Southwest			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	5	616,098	0.55	0.78	3	149,278	0.19	0.25
3 to 5	8	1,529,596	0.63	1.05	2	206,337	0.62	0.55
6 to 8	16	3,216,929	0.79	0.85	6	1,167,643	0.57	0.48
9 to 11	3	233,058	1.07	1.23	1	97,000	1.20	1.20
12 to 14	5	808,074	0.70	0.57	1	123,000	0.97	0.97
15 to 17	2	419,234	2.24	2.24	4	453,330	0.59	0.59
18 to 20	1	189,700	6.49	6.49	1	209,772	0.64	0.64
21 to 23	0	-	-	-	0	-	-	-
24 +	1	452,617	0.10	0.10	1	210,851	0.98	0.98
Total	41	7,465,306	0.92	1.06	19	2,617,211	0.63	0.57

Age (Yrs.) at Start of Holding Period				
	West			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	14	1,414,877	0.30	0.28
3 to 5	7	1,029,727	0.43	0.29
6 to 8	6	1,395,685	1.48	1.62
9 to 11	3	842,892	1.29	0.87
12 to 14	0	-	-	-
15 to 17	1	536,422	1.59	1.59
18 to 20	0	-	-	-
21 to 23	0	-	-	-
24 +	0	-	-	-
Total	31	5,219,603	0.93	0.64

FIVE YEAR HOLDING PERIOD SAMPLE
RESULTS MATRIX
BY AGE AT START OF HOLDING PERIOD

BY BUILDING SIZE

Age (Yrs.) at Start of Holding Period	Building Size							
	< 100,000 Square Feet				100,000 to 249,999 Square Feet			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	17	1,026,383	0.38	0.36	14	1,996,750	0.26	0.29
3 to 5	10	667,505	0.81	0.80	11	1,600,245	0.68	0.71
6 to 8	12	920,532	1.08	1.07	18	2,538,369	0.99	0.91
9 to 11	6	401,686	1.35	1.30	2	289,844	0.62	0.63
12 to 14	2	181,174	0.88	0.87	3	377,900	0.32	0.32
15 to 17	4	259,230	0.61	0.46	2	287,778	0.42	0.36
18 to 20	1	76,963	2.11	2.11	2	399,472	3.42	3.57
21 to 23	1	91,009	-	-	0	-	-	-
24 +	0	-	-	-	1	210,851	0.98	0.98
Total	53	3,624,482	0.82	0.76	53	7,701,209	0.79	0.74

Age (Yrs.) at Start of Holding Period								
	250,000 to 499,999 Square Feet				500,000 to 999,999 Square Feet			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	1	275,000	-	-	7	4,065,000	0.18	0.18
3 to 5	4	1,533,623	0.78	0.75	2	1,235,303	0.36	0.35
6 to 8	4	1,434,240	0.86	0.73	3	1,840,850	0.66	0.68
9 to 11	1	418,916	2.21	2.21	1	634,370	1.53	1.53
12 to 14	1	372,000	1.09	1.09	1	769,570	6.51	6.51
15 to 17	3	687,787	1.54	1.64	2	1,041,422	2.18	2.20
18 to 20	1	437,646	1.24	1.24	9	1,693,455	3.00	1.66
21 to 23	1	314,500	3.44	3.44	0	-	-	-
24 +	5	2,268,195	1.26	1.26	1	661,740	6.14	6.14
Total	21	7,741,907	1.20	1.20	26	11,941,710	1.66	1.45

Age (Yrs.) at Start of Holding Period				
	Over 1,000,000 Square Feet			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	0	-	-	-
3 to 5	0	-	-	-
6 to 8	0	-	-	-
9 to 11	0	-	-	-
12 to 14	0	-	-	-
15 to 17	1	1,053,000	2.81	2.81
18 to 20	0	-	-	-
21 to 23	0	-	-	-
24 +	0	-	-	-
Total	1	1,053,000	2.81	2.81

FIVE YEAR HOLDING PERIOD SAMPLE
RESULTS MATRIX
BY YEAR BUILT

BY MARKET ORIENTATION

Year Built	Urban vs. Suburban							
	URBAN				SUBURBAN			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	3	890,426	0.28	0.44	2	218,285	0.01	0.02
1987-1989	2	1,215,000	0.18	0.20	13	1,852,295	0.28	0.35
1984-1986	7	3,668,803	0.26	0.26	26	3,034,140	0.70	0.45
1981-1983	4	1,587,562	1.06	1.05	40	5,387,308	0.78	0.87
1978-1980	4	1,398,999	0.78	0.52	9	713,499	1.17	1.20
1974-1977	1	315,327	0.09	0.09	7	1,109,130	1.23	1.09
1970-1974	12	5,466,969	3.30	2.91	13	1,371,535	0.97	0.87
1960-1969	1	314,500	3.44	3.44	3	377,744	0.78	0.92
< 1960	7	3,140,786	2.27	1.92	0	-	-	-
Total	41	17,998,372	1.69	1.50	113	14,063,936	0.76	0.74

BY BUILDING HEIGHT

Year Built	Building Height							
	Greater Than 10 Floors				Less Than 10 Floors			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	3	890,426	0.28	0.44	2	218,285	0.01	0.02
1987-1989	3	1,414,103	0.17	0.16	12	1,653,192	0.31	0.38
1984-1986	8	4,327,303	0.46	0.53	25	2,375,640	0.45	0.37
1981-1983	6	1,979,762	0.98	0.91	38	4,995,108	0.79	0.88
1978-1980	3	1,279,455	0.82	0.59	10	833,043	1.04	1.11
1974-1977	2	687,327	0.63	0.59	6	737,130	1.30	1.09
1970-1974	9	4,671,695	3.46	2.94	16	2,166,809	1.48	1.23
1960-1969	1	314,500	3.44	3.44	3	377,744	0.78	0.92
< 1960	7	3,140,786	2.27	1.92	0	-	-	-
Total	42	18,705,357	1.62	1.38	112	13,356,951	0.81	0.78

FIVE YEAR HOLDING PERIOD SAMPLE
RESULTS MATRIX
BY YEAR BUILT

BY GEOGRAPHIC REGION

Year Built	Geographic Region							
	Northeast				Southeast			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	2	655,000	0.05	0.03	0	-	-	-
1987-1989	6	1,856,675	0.22	0.27	1	76,919	0.03	0.03
1984-1986	12	3,851,746	0.53	0.70	2	88,927	-	-
1981-1983	6	448,232	0.87	0.90	3	350,175	0.79	0.86
1978-1980	5	917,579	0.39	0.74	0	-	-	-
1974-1977	1	315,327	0.09	0.09	0	-	-	-
1970-1974	15	4,315,902	3.18	1.75	2	923,916	2.54	2.51
1960-1969	3	482,472	2.58	1.85	0	-	-	-
< 1960	5	2,477,318	2.78	2.47	0	-	-	-
Total	55	15,320,251	1.64	1.15	8	1,439,937	1.82	0.95

Year Built	Geographic Region							
	Midwest				Southwest			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	0	-	-	-	0	-	-	-
1987-1989	4	652,969	0.32	0.41	0	-	-	-
1984-1986	4	1,117,315	0.47	0.56	4	232,701	0.19	0.23
1981-1983	20	3,523,223	0.85	1.03	6	1,167,643	0.57	0.48
1978-1980	4	302,174	1.13	1.26	2	219,914	1.04	1.06
1974-1977	5	808,074	0.70	0.57	1	123,000	0.97	0.97
1970-1974	3	608,934	3.56	3.65	4	453,330	0.59	0.59
1960-1969	0	-	-	-	1	209,772	0.64	0.64
< 1960	1	452,617	0.10	0.10	1	210,851	0.98	0.98
Total	41	7,465,306	0.92	1.06	19	2,617,211	0.63	0.57

Year Built	Geographic Region			
	West			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	3	453,711	0.48	0.44
1987-1989	4	480,732	0.28	0.42
1984-1986	11	1,412,254	0.33	0.18
1981-1983	9	1,485,597	1.03	0.83
1978-1980	2	672,831	1.47	1.02
1974-1977	1	178,056	3.82	3.82
1970-1974	1	536,422	1.59	1.59
1960-1969	0	-	-	-
< 1960	0	-	-	-
Total	31	5,219,603	0.93	0.64

FIVE YEAR HOLDING PERIOD SAMPLE
RESULTS MATRIX
BY YEAR BUILT

BY BUILDING SIZE

Year Built	Building Size							
	< 100,000 Square Feet				100,000 to 249,999 Square Feet			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	1	83,285	0.03	0.03	3	505,426	0.43	0.43
1987-1989	6	491,699	0.44	0.46	6	1,013,826	0.24	0.28
1984-1986	13	751,499	0.15	0.15	11	1,349,141	0.71	0.67
1981-1983	18	1,218,821	1.24	1.16	20	2,796,286	0.69	0.66
1978-1980	7	470,802	1.35	1.31	4	582,473	0.45	0.52
1974-1977	2	181,174	0.88	0.87	4	555,956	1.44	1.20
1970-1974	4	259,230	0.61	0.46	3	477,478	2.83	2.41
1960-1969	2	167,972	0.97	1.06	1	209,772	0.64	0.64
< 1960	0	-	-	-	1	210,851	0.98	0.98
Total	53	3,624,482	0.82	0.76	53	7,701,209	0.79	0.74

Year Built	Building Size							
	250,000 to 499,999 Square Feet				500,000 to 999,999 Square Feet			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	0	-	-	-	1	520,000	0.06	0.06
1987-1989	1	346,770	0.18	0.18	2	1,215,000	0.18	0.20
1984-1986	3	1,037,000	1.05	0.90	6	3,565,303	0.26	0.25
1981-1983	3	1,118,913	1.07	0.95	3	1,840,850	0.66	0.68
1978-1980	1	424,853	0.12	0.12	1	634,370	1.53	1.53
1974-1977	2	687,327	0.63	0.59	0	-	-	-
1970-1974	5	1,544,349	1.64	1.68	12	3,504,447	3.53	2.16
1960-1969	1	314,500	3.44	3.44	0	-	-	-
< 1960	5	2,268,195	1.26	1.26	1	661,740	6.14	6.14
Total	21	7,741,907	1.20	1.20	26	11,941,710	1.66	1.45

Year Built	Building Size			
	Over 1,000,000 Square Feet			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	0	-	-	-
1987-1989	0	-	-	-
1984-1986	0	-	-	-
1981-1983	0	-	-	-
1978-1980	0	-	-	-
1974-1977	0	-	-	-
1970-1974	1	1,053,000	2.81	2.81
1960-1969	0	-	-	-

Appendix C: Ten Year Holding Period Results

TEN YEAR HOLDING PERIOD SAMPLE
RESULTS MATRIX
BY AGE AT START OF HOLDING PERIOD

BY MARKET ORIENTATION

Age (Yrs.) at Start of Holding Period	Urban vs. Suburban							
	URBAN				SUBURBAN			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	5	2,433,500	0.21	0.26	19	1,777,042	0.36	0.43
3 to 5	3	764,171	0.31	0.41	10	781,432	0.67	0.69
6 to 8	1	315,327	0.23	0.23	2	247,172	3.12	2.43
9 to 11	1	418,916	4.69	4.69	1	38,461	1.17	1.17
12 to 14	1	769,570	5.99	5.99	0	-	-	-
15 to 17	2	419,234	1.46	1.46	1	68,503	1.05	1.05
18 to 20	0	-	-	-	1	76,963	1.75	1.75
21 to 23	0	-	-	-	0	-	-	-
24 +	1	450,000	2.19	2.19	0	-	-	-
Total	14	5,570,718	1.62	1.32	34	2,989,573	0.73	0.70

BY BUILDING HEIGHT

Age (Yrs.) at Start of Holding Period	Building Height							
	Greater Than 10 Floors				Less Than 10 Floors			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	4	2,330,000	0.20	0.20	20	1,880,542	0.37	0.44
3 to 5	2	644,627	0.23	0.24	11	900,976	0.68	0.69
6 to 8	1	315,327	0.23	0.23	2	247,172	3.12	2.43
9 to 11	1	418,916	4.69	4.69	1	38,461	1.17	1.17
12 to 14	1	769,570	5.99	5.99	0	-	-	-
15 to 17	2	419,234	-	-	1	68,503	1.05	1.05
18 to 20	0	-	-	-	1	76,963	1.75	1.75
21 to 23	0	-	-	-	0	-	-	-
24 +	1	450,000	2.19	2.19	0	-	-	-
Total	12	5,347,674	1.54	1.20	36	3,212,617	0.72	0.70

TEN YEAR HOLDING PERIOD SAMPLE
RESULTS MATRIX
BY AGE AT START OF HOLDING PERIOD

BY GEOGRAPHIC REGION

Age (Yrs.) at Start of Holding Period	Geographic Region							
	Northeast				Southeast			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	7	2,918,527	0.18	0.19	2	88,927	0.05	0.05
3 to 5	4	924,171	0.27	0.33	0	-	-	-
6 to 8	1	315,327	0.23	0.23	0	-	-	-
9 to 11	0	-	-	-	1	418,916	4.69	4.69
12 to 14	1	769,570	5.99	5.99	0	-	-	-
15 to 17	1	68,503	1.05	1.05	0	-	-	-
18 to 20	1	76,963	1.75	1.75	0	-	-	-
21 to 23	0	-	-	-	0	-	-	-
24 +	1	450,000	2.19	2.19	0	-	-	-
Total	16	5,523,061	1.21	0.86	3	507,843	3.88	1.60

Age (Yrs.) at Start of Holding Period	Geographic Region							
	Midwest				Southwest			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	2	162,232	1.02	1.22	3	149,278	1.56	1.08
3 to 5	4	316,678	1.12	1.24	1	122,914	0.67	0.67
6 to 8	1	69,116	0.88	0.88	0	-	-	-
9 to 11	0	-	-	-	0	-	-	-
12 to 14	0	-	-	-	0	-	-	-
15 to 17	2	419,234	1.46	1.46	0	-	-	-
18 to 20	0	-	-	-	0	-	-	-
21 to 23	0	-	-	-	0	-	-	-
24 +	0	-	-	-	0	-	-	-
Total	9	967,260	1.23	1.24	4	272,192	1.16	0.98

Age (Yrs.) at Start of Holding Period	Geographic Region			
	West			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	10	891,578	0.24	0.24
3 to 5	4	181,840	0.42	0.29
6 to 8	1	178,056	3.99	3.99
9 to 11	1	38,461	1.17	1.17
12 to 14	0	-	-	-
15 to 17	0	-	-	-
18 to 20	0	-	-	-
21 to 23	0	-	-	-
24 +	0	-	-	-
Total	16	1,289,935	0.81	0.55

TEN YEAR HOLDING PERIOD SAMPLE
RESULTS MATRIX
BY AGE AT START OF HOLDING PERIOD

BY BUILDING SIZE

Age (Yrs.) at Start of Holding Period	Building Size							
	< 100,000 Square Feet				100,000 to 249,999 Square Feet			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	12	642,875	0.35	0.38	7	962,667	0.48	0.59
3 to 5	7	392,606	1.06	0.85	5	728,144	0.36	0.38
6 to 8	1	69,116	0.88	0.88	1	178,056	3.99	3.99
9 to 11	1	38,461	1.17	1.17	0	-	-	-
12 to 14	0	-	-	-	0	-	-	-
15 to 17	1	68,503	1.05	1.05	0	-	-	-
18 to 20	1	76,963	1.75	1.75	0	-	-	-
21 to 23	0	-	-	-	0	-	-	-
24 +	0	-	-	-	0	-	-	-
Total	23	1,288,524	0.74	0.67	13	1,868,867	0.77	0.77

Age (Yrs.) at Start of Holding Period	Building Size							
	250,000 to 499,999 Square Feet				500,000 to 999,999 Square Feet			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	1	275,000	0.01	0.01	4	2,330,000	0.20	0.20
3 to 5	1	424,853	0.21	0.21	0	-	-	-
6 to 8	1	315,327	0.23	0.23	0	-	-	-
9 to 11	1	418,916	4.69	4.69	0	-	-	-
12 to 14	0	-	-	-	1	769,570	5.99	5.99
15 to 17	2	419,234	1.46	1.46	0	-	-	-
18 to 20	0	-	-	-	0	-	-	-
21 to 23	0	-	-	-	0	-	-	-
24 +	1	450,000	2.19	2.19	0	-	-	-
Total	7	2,303,330	1.62	1.46	5	3,099,570	1.64	1.36

Age (Yrs.) at Start of Holding Period	Building Size			
	Over 1,000,000 Square Feet			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
0 to 2	0	-	-	-
3 to 5	0	-	-	-
6 to 8	0	-	-	-
9 to 11	0	-	-	-
12 to 14	0	-	-	-
15 to 17	0	-	-	-
18 to 20	0	-	-	-
21 to 23	0	-	-	-
24 +	0	-	-	-
Total	0	-	-	-

TEN YEAR HOLDING PERIOD SAMPLE
RESULTS MATRIX
BY YEAR BUILT

BY MARKET ORIENTATION

Year Built	Urban vs. Suburban							
	URBAN				SUBURBAN			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	0	-	-	-	0	-	-	-
1987-1989	0	-	-	-	1	219,668	0.11	0.11
1984-1986	5	2,433,500	0.21	0.26	18	1,582,575	0.35	0.38
1981-1983	0	-	-	-	9	633,317	0.79	0.83
1978-1980	3	764,171	0.31	0.41	3	230,491	0.82	0.91
1975-1977	1	315,327	0.23	0.23	1	178,056	3.99	3.99
1970-1974	4	1,607,720	4.47	3.40	1	68,503	1.05	1.05
1960-1969	0	-	-	-	1	76,963	1.75	1.75
< 1960	1	450,000	2.19	2.19	0	-	-	-
Total	14	5,570,718	1.62	1.32	34	2,989,573	0.73	0.70

BY BUILDING HEIGHT

Year Built	Building Height							
	Greater Than 10 Floors				Less Than 10 Floors			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	0	-	-	-	0	-	-	-
1987-1989	0	-	-	-	1	219,668	0.11	0.11
1984-1986	4	2,330,000	0.20	0.20	19	1,686,075	0.36	0.39
1981-1983	0	-	-	-	9	633,317	0.79	0.83
1978-1980	2	644,627	0.23	0.24	4	350,035	0.80	0.87
1975-1977	1	315,327	0.23	0.23	1	178,056	3.99	3.99
1970-1974	4	1,607,720	4.47	3.40	1	68,503	1.05	1.05
1960-1969	0	-	-	-	1	76,963	1.75	1.75
< 1960	1	450,000	2.19	2.19	0	-	-	-
Total	12	5,347,674	1.66	1.44	36	3,212,617	0.72	0.70

TEN YEAR HOLDING PERIOD SAMPLE
RESULTS MATRIX
BY YEAR BUILT

BY GEOGRPAHIC REGION

Year Built	Geographic Region							
	Northeast				Southeast			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	0	-	-	-	0	-	-	-
1987-1989	0	-	-	-	0	-	-	-
1984-1986	7	2,918,527	0.18	0.19	2	88,927	0.05	0.05
1981-1983	1	160,000	0.07	0.07	0	-	-	-
1978-1980	3	764,171	0.31	0.41	0	-	-	-
1975-1977	1	315,327	0.23	0.23	0	-	-	-
1970-1974	2	838,073	5.59	3.52	1	418,916	4.69	4.69
1960-1969	1	76,963	1.75	1.75	0	-	-	-
< 1960	1	450,000	2.19	2.19	0	-	-	-
Total	16	5,523,061	1.21	0.86	3	507,843	3.88	1.60

Year Built	Geographic Region							
	Midwest				Southwest			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	0	-	-	-	0	-	-	-
1987-1989	0	-	-	-	0	-	-	-
1984-1986	1	103,500	0.50	0.50	3	149,278	1.56	1.08
1981-1983	5	375,410	1.25	1.38	0	-	-	-
1978-1980	1	69,116	0.88	0.88	1	122,914	0.67	0.67
1975-1977	0	-	-	-	0	-	-	-
1970-1974	2	419,234	1.46	1.46	0	-	-	-
1960-1969	0	-	-	-	0	-	-	-
< 1960	0	-	-	-	0	-	-	-
Total	9	967,260	1.23	1.24	4	272,192	1.16	0.98

Year Built	Geographic Region			
	West			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	0	-	-	-
1987-1989	1	219,668	0.11	0.11
1984-1986	10	755,843	0.33	0.30
1981-1983	3	97,907	0.22	0.17
1978-1980	1	38,461	1.17	1.17
1975-1977	1	178,056	3.99	3.99
1970-1974	0	-	-	-
1960-1969	0	-	-	-
< 1960	0	-	-	-
Total	16	1,289,935	0.81	0.55

TEN YEAR HOLDING PERIOD SAMPLE
RESULTS MATRIX
BY YEAR BUILT

BY BUILDING SIZE

Year Built	Building Size							
	< 100,000 Square Feet				100,000 to 249,999 Square Feet			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	0	-	-	-	0	-	-	-
1987-1989	0	-	-	-	1	219,668	0.11	0.11
1984-1986	12	668,076	0.25	0.28	6	742,999	0.58	0.67
1981-1983	7	367,405	1.30	1.04	2	265,912	0.10	0.11
1978-1980	2	107,577	0.98	1.03	3	462,232	0.51	0.57
1975-1977	0	-	-	-	1	178,056	3.99	3.99
1970-1974	1	68,503	1.05	1.05	0	-	-	-
1960-1969	1	76,963	1.75	1.75	0	-	-	-
< 1960	0	-	-	-	0	-	-	-
Total	23	1,288,524	0.74	0.67	13	1,868,867	0.77	0.77

Year Built	Building Size							
	250,000 to 499,999 Square Feet				500,000 to 999,999 Square Feet			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	0	-	-	-	0	-	-	-
1987-1989	0	-	-	-	0	-	-	-
1984-1986	1	275,000	0.01	0.01	4	2,330,000	0.20	0.20
1981-1983	0	-	-	-	0	-	-	-
1978-1980	1	424,853	0.21	0.21	0	-	-	-
1975-1977	1	315,327	0.23	0.23	0	-	-	-
1970-1974	3	838,150	3.07	2.54	1	769,570	5.99	5.99
1960-1969	0	-	-	-	0	-	-	-
< 1960	1	450,000	2.19	2.19	0	-	-	-
Total	7	2,303,330	1.62	1.46	5	3,099,570	1.64	1.36

Year Built	Building Size			
	Over 1,000,000 Square Feet			
	Number of Buildings	Building Area (SF)	Wtd. Avg. Ann. BBC	Mean Ann. BBC
1990+	0	-	-	-
1987-1989	0	-	-	-
1984-1986	0	-	-	-
1981-1983	0	-	-	-
1978-1980	0	-	-	-
1975-1977	0	-	-	-
1970-1974	0	-	-	-
1960-1969	0	-	-	-
< 1960	0	-	-	-
Total	0	-	-	-

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